

Eastern Regional Research Laboratory
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Vegetable Wastes
Availability and Utilization

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INTRODUCTION

The Eastern Regional Research Laboratory has undertaken to find industrial uses for the waste incident to the commercial production and processing of vegetables. This waste, which occurs on the farm and at the packing shed and processing plants, consists essentially of the discarded culms, vines, leaves, tops or roots, trimmings and peelings. In addition, there is another large source of waste in the crops that are not harvested because of unsatisfactory quality, market conditions, and shortage of labor.

Because of the highly perishable nature of this waste and its rapid accumulation, it must be disposed of as quickly as possible. On the farm it is usually fed to livestock, if suitable, or turned under to enrich the soil. The processing-plant waste may be returned in part, to neighboring farms, hauled to a dump, or treated for sewage disposal. These methods, however, entail expense.

No comprehensive collected information has been available on the quantity, kinds, location, and season of the various types of waste, although this information would constitute the necessary background for their commercial utilization. The data in this publication were assembled from widely scattered sources with the object of supplying this background information for the use of anyone considering the utilization of vegetable wastes. It is impossible to predict the exact quantity of suitable raw material that would be available in any particular region, inasmuch as there is wide variation in farm and processing-plant practices, crop yields, quality and potential value of waste materials, and many other factors that would materially affect the quantity of waste available. The information assembled here should prove useful, however, in determining the most suitable location for the commercial utilization of these wastes.

Present information on these wastes indicates that the leaves are by far the richest in valuable constituents. For this reason, this survey deals mainly with the leafy wastes. The outlook is most promising for the production of animal feeds, carotene, and chlorophyll from this material. Chlorophyll is used as a dye and is attracting attention as a constituent of therapeutic ointments. Carotene (pro-vitamin A), which is sold for therapeutic and nutritive purposes, is now made from carrot roots.

An effort has been made to simplify the presentation of the large amount of data necessarily involved in this type of survey by using tables and illustrations

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instead of detailed descriptions and explanations. The tables and illustrations are grouped separately and arranged in sequence within the group. For ready reference the titles are listed in the Contents, under the topic to which the data pertain.

The year 1942 was selected as the basic year for the survey, because it was the most recent period for which complete data could be obtained. The source of the data is indicated under the tables.

CROP PRODUCTION

To arrive at a basis for estimating the quantities and distribution of vegetable-waste materials, it is necessary to know the quantities and location of the crops produced and processed. Therefore in this report information on crop production and processing precedes the discussion of occurrence and utilization of waste.

Table 1 and Figure 1 show the total production of the twenty-six important truck crops for fresh market and processing over the 14-year period 1929-1943. These data indicate a decided trend toward the processing of vegetables, a trend which is of particular interest in this study because of the centralization of waste materials at processing plants. Areas in which the vegetables are grown and their processing centers are located are shown in Figures 2 and 3.

From the standpoint of abundance, occurrence in large concentrations, and nutritional value, the leafy wastes of the following vegetables seem to have the greatest promise, and therefore attention has been largely devoted to them.

Beets	Carrots	Lima beans	Turnips
Broccoli	Cauliflower	Peas	Spinach
Cabbage	Kale	Rutabagas	Tomatoes ^{4/}

^{4/} / Although tomatoes do not have a utilizable leafy waste, they have an abundant processing plant waste, which is now commercially processed for animal feed.

Tables 2 and 3 contain data on the production of these crops, with the exception of rutabagas and turnips. These vegetables represent 43 percent, by weight, of all important crops grown for fresh market and 69 percent of all grown for processing. Table 4, which gives data on the production of each vegetable for fresh market and processing by States, shows that in certain States these crops are produced largely for fresh market, while in others they are produced primarily for processing. The factors in Table 6 were used to convert the fresh market units to a tonnage basis. As few data are available on some crops for 1942, the estimated production for 1939, based on the 1939 acreage shown in the 1940 census, is given in Table 5.

The rank of each State in the production of vegetable crops for fresh market and processing is presented in Table 7. California ranks first for both. This table should be useful in determining both the relative importance of each State in the production of the different vegetables and the leading vegetables grown and processed in the different States. The quantity of each vegetable grown or processed in any particular locality in any State may be estimated from the data in Figures 4 to 20 inclusive.

PROCESSED CROP PRODUCTION

General methods of processing various vegetables are graphically portrayed in Figure 21.

Inasmuch as the canned pack constituted more than 96 percent, by weight, of the crops processed in 1942, a detailed break-down by States for each vegetable processed by this method is shown in Table 8. The frozen pack for 1942 is shown by region in Table 9. The estimated dehydrated pack for 1942 and 1943 is shown in Table 10.

The quantities in Tables 8, 9, and 10 have been converted to their equivalent farm weight in Table 11. By farm weight is meant that portion of the harvested crop prepared for shipment to either processing plants or fresh market. The fresh market totals in Table 11 were obtained by subtracting all the additional known processed quantities from the fresh market quantities of Table 4.

Distribution of processing plants by States is indicated in Table 12. Forage driers have been included, as some of these may be adapted to drying vegetable wastes. Additional information on forage driers is given later in the paper.

The number of plants processing the vegetables selected for this survey is shown by States in Table 13. Owing to the fact that many of the plants pack more than one vegetable and by more than one process, it is not possible to total these figures horizontally, that is, by States.

OCCURRENCE OF VEGETABLE WASTES

Distribution

An estimate of the quantity of waste available from different sources, obtained by the application of waste factors to the estimated farm weights of crops in Table 11, is shown in Table 14. The waste factors are based on information obtained from fresh-market packing plants, processing plants, and trade organizations and publications. Where possible, allowance has been made for variations in practice in different sections of the country.

As indicated in Table 14, the wastes occur at the farm, winery, packing plant, and processing plant. The vineyards, generally owned by the processing plants, are strategically located to handle the lima bean and pea vines directly from the field.

In considering the waste that might be available for commercial utilization, it should be taken into account that in addition to the quantities indicated in Table 14 there are appreciable quantities available from crops not harvested because of unsatisfactory conditions, such as poor quality, unfavorable markets, or labor shortage. At best, only a rough approximation of wastes is possible, as there are many unpredictable factors, such as differences in yields, quality, and farming and processing procedures.

Seasonal Availability

Tables 15 and 16 and Figures 22 to 48, inclusive, indicate the period during which these waste materials are available in different sections of the country. Table 15 and related Figures 22 to 28 show the peak of the growing season by regions; Table 16 and the corresponding Figures 29 to 48 show the operating dates for packing by States. These dates naturally vary somewhat from year to year. For any commercial operation, the production period should be extended over as long a time as possible in order to reduce overhead costs.

UTILIZATION OF VEGETABLE WASTES

Present Practice

The waste on the farm may be used for feed if suitable and easy to collect. In many cases, however, it can be used only as a supplementary feed. It may also be plowed under to enrich the soil, but there is possible danger that it may cause soil infection, especially if the material is not composted or the crops are not rotated.

Disposal of the refuse from the processing plant usually represents a much more serious problem, owing to the large quantities involved and their rapid decomposition, which may be a definite menace to health. If the distance is not too great, this material is frequently returned to neighboring farms. Otherwise, it may be either hauled to a dump or treated for subsequent disposal in a municipal or processing-plant sewage system. As a rule, the disposal of this material entails a definite expense to the processor, especially if it necessitates an initial capital expenditure for a sewage-treatment plant. Some packing and processing plants dispose of their pea vines and other suitable materials by feeding them to cattle, which they keep for this purpose.

In the Salinas Valley of California, one company is artificially drying waste lettuce for poultry feed. Wastes from processing of tomatoes are also being commercially dried for feed.

Current Investigations

Research work on wastes at this Laboratory has included a study of the carotene and riboflavin content of various leafy wastes, methods of extraction and purification of carotene, separation of the high-value leaf blades from the stems and midribs,^{5/},^{6/} preparation of relatively large quantities of dried leaf meals and a study, in cooperation with the Delaware Agricultural Experiment Station, of their value as poultry feed,^{7/} and an investigation on the best methods of preparing dried leaf meals from vegetable wastes on a commercial scale.

^{5/} Carotene in Vegetable Wastes, by E. G. Kelley and M. E. Wall. Vegetable Growers Association of America Annual Report 1942, p. 62.

^{6/} Vegetable Wastes as Animal Feedstuffs, by E. G. Kelley, M. E. Wall and J. J. Willaman. Feedstuffs, vol. 15, no. 26, p. 18, 1943.

^{7/} Preliminary Investigation on the Use of Certain Dried Vegetable Wastes as Poultry Feeds, by A. E. Tomhave and Edward Hoffman (Delaware Agricultural Experiment Station) in cooperation with E. G. Kelley, Monroe E. Wall, and David A. Colker (Eastern Regional Research Laboratory). Delaware Agricultural Experiment Station Bulletin 247, 32 pp., 1944.

Processing: Studies on the most suitable drying equipment and the costs involved have not been completed. The wastes, however, have been divided into two classes according to their behavior in driers. Materials such as pea vines and carrot tops, which form a porous bed readily permitting passage of air through it, are in Class I. Such products could probably be dried in certain types of alfalfa driers. The location of some of the driers now in operation and the names of their manufacturers are shown in Table 17 and Figure 49. Since the pea season is so short, it would not be profitable to install a drier for this product alone unless the vines could be ensiled to extend the drying season. This may be feasible and is now under investigation. As it might also be desirable to include alfalfa in this drying program, data on the production of alfalfa are given in Table 18 and Figure 50. In Tables 19 and 20 are shown the relative tonnages of sun-cured and dehydrated alfalfa meals produced in the different States and the States to which they are shipped.

In Class II are wastes such as beet tops, broccoli, turnip tops, and lima bean leaves, which form an almost impervious bed and therefore must be agitated at intervals during drying. A drier for Class II should be provided with a series of aprons or conveyors running at progressively slower speeds. The material turns over as it falls from one apron to the next, and the depth of the bed increases on succeeding aprons, thereby increasing the overall capacity of the drier. A drier suitable for material in Class I would be cheaper but probably could not be used for materials in Class II. A drier suitable for Class II material, however, should handle materials of the first group.

The process for recovering the leaf blade portion of all the wastes investigated, except pea vines, consists in flash drying the material with air at about 240° F. The leaf portion becomes dry and brittle while the stems remain moist and tough. The dried product is tumbled with stones in a rotating screen, causing it to fracture and pass through the screen into the grinding equipment. Pea vines are entirely dried, then ground and screened much in the same manner as alfalfa.

Yields: Exact figures on yields obtained by drying various vegetable wastes cannot be given, owing primarily to the wide variation in the moisture content of the raw material. However, the estimated yields in Table 21, which are based on the results of some experimental runs in our pilot plant, may be used as a guide. These data were obtained by determining the weight after the material was dried to 5 percent moisture.

To prevent spoilage, the moisture content of the dried product should be not more than 10 percent.

Nutritional value: The percentages of selected nutrients in the dried leaves and stems are given in Table 22. For comparison with a commercial product, alfalfa-leaf meal is included. These data show that the leaves are about twice as nutritious as the stems. Broccoli leaves are particularly high in all nutrients. Owing to the wide variations that occur, these figures should be used only as a guide. The factors 454 grams per pound and 1.6 International Units per microgram of carotene may be useful in converting micrograms per gram to International Units per pound.

Preliminary feeding tests^{1/} with chicks showed that broccoli-leaf meal is somewhat better than lima bean-leaf meal; that turnip and carrot tops are about equal to alfalfa; and that pea vines are somewhat inferior to alfalfa.

Inasmuch as vegetable crops are frequently treated with insecticides that contain toxic materials such as lead arsenate and copper compounds, it is necessary to make sure that their residues are within a safe limit in the final, prepared product.

Markets

Owing to the relatively high nutritional value of these dried vegetable materials, they should be in demand as an ingredient in feeds, of which there is at present a serious shortage (Table 23). The dried leaf portion shows promise as a source of protein and vitamins for poultry feeds, and the stems may be useful as a feed for other animals or as poultry litter.

Comparison of the production and distribution of poultry feed with alfalfa meal and other feeds may be obtained from Tables 24 and 25. Of the 517,671 tons of alfalfa meal produced in 1942, approximately 260,000 tons, or 50 percent, were artificially dried.

That areas in which most of the vegetable wastes occur approximately coincide with those for poultry growing can be seen by reference to Figures 2 and 3, which show the vegetable growing and processing areas, and Table 26 and Figure 51, which show the distribution of chickens. Therefore, poultry feeds prepared from vegetable wastes could be used within the areas of production, eliminating high charges for freight.

SUMMARY

This survey shows the distribution and production of vegetable crops, gives information on processing plants, and indicates the estimated quantities of vegetable wastes available from fresh marketing and processing plants. It also gives some information pertaining to the utilization of vegetable wastes, especially as an ingredient of poultry feeds.

TABLE 1

Commercial Acreage and Production of 26 Truck Crops^{1/}, 1929-1943

Year	Acreage		Production - Tons		
	For fresh market	For processing	Total	For fresh market	For processing
	Acres	%	Tons	Tons	%
1929	1,381,710	1,181,410	44.3	2,563,120	6,044,600
1930	1,533,230	1,374,740	47.3	2,907,970	6,150,500
1931	1,571,900	1,117,390	41.5	2,689,290	5,945,300
1932	1,630,740	779,370	32.3	2,410,110	6,004,000
1933	1,536,590	894,260	36.7	2,430,850	5,333,100
1934	1,728,280	1,153,050	40.0	2,881,330	6,176,000
1935	1,695,850	1,454,350	46.1	3,150,200	5,986,300
1936	1,793,260	1,364,940	43.2	3,158,200	6,203,000
1937	1,710,340	1,562,470	47.8	3,272,810	6,294,900
1938	1,751,880	1,393,840	44.3	3,145,720	6,718,300
1939	1,775,540	1,138,560	39.0	2,914,100	6,723,100
1940	1,719,530	1,377,000	44.5	3,096,530	6,801,000
1941	1,695,420	1,640,660	49.2	3,336,080	6,551,600
1942	1,662,470	1,968,050	54.2	3,630,520	7,013,200
1943	1,559,850	1,902,150	54.9	3,462,000	6,507,700
				4,981,200	43.4
					11,488,900

^{1/} Crops for market: Artichokes, asparagus, lima beans, snap beans, beets, cabbage, cantaloups, carrots, cauliflower, celery, sweet corn, cucumbers, eggplant, escarole, honeydews, kale, lettuce, onions, green peas, green peppers, shallots, spinach, tomatoes, and watermelons.

Crops for processing: Asparagus (calif.), lima beans, snap beans, beets, cabbage for kraut, sweet corn, cucumbers for pickles, green peas, pimientos, spinach and tomatoes.

TABLE 2

Crops for Fresh Market - Total United States

	Beets	Broccoli	Cabbage	Carrots	Cauli-flower	Kale	Lima beans	Peas	Spinach	Tomatoes
	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>2/</u>	<u>2/</u>	<u>1/</u>	<u>2/</u>
<u>Acreage</u>										
10 yrs. ave.	1931-1940	11,470	3/	158,000	43,730	30,870	1,780	18,470	105,710	65,310
1941	12,270	8,500	141,360	56,380	32,150	1,700	25,050	85,550	64,150	192,500
1942	11,380	8,550	170,070	60,780	32,230	1,600	22,380	70,980	70,280	198,730
1943	12,300	8,750	159,640	83,690	26,440	1,650	19,150	62,250	72,200	211,730
										220,180
<u>Yield per acre</u>										
10 yrs. ave.		184	3/	6.55	305	266	360	64	79	221
1941		172	120	6.77	320	265	520	61	92	115
1942		187	155	7.51	333	294	275	70	88	206
1943		179	130	6.46	322	286	445	63	97	211
									201	126
										119
<u>Production in thousands</u>										
10 yrs. ave.	1931-1940	2,113	3/	1,034.8	13,332	8,207	619	1,178	8,375	14,403
1941	2,108	1,020	956.9	18,034	8,524	884	1,530	7,911	13,186	22,130
1942	2,128	1,325	1,276.5	20,216	9,481	440	1,574	6,214	14,815	24,075
1943	2,203	1,138	1,031.2	26,911	7,569	734	1,206	6,058	14,531	26,618
										26,101
<u>Price per unit</u>										
10 yrs. ave.		.46	2/	13.84	.68	.64	.34	1.38	1.17	.42
1941		.45	1.35	20.87	.75	.79	.23	1.51	1.26	.50
1942		.62	1.80	16.72	1.21	1.03	.55	1.82	1.59	.61
1943		1.21	3.50	46.23	1.37	1.87	.85	2.84	2.31	.94
										2.85
<u>Farm value</u>										
10 yrs. ave.		950	3/	13,825	8,940	5,247	196	1,626	9,740	6,021
1941		914	1,377	19,888	13,576	6,707	203	2,313	9,957	6,594
1942		1,330	2,385	19,667	24,445	9,758	242	2,863	9,894	9,049
1943		2,668	3,829	47,571	36,610	14,170	624	3,427	13,973	55,781
										74,277

1/ Undetermined quantities used for processing
 2/ Unshelled
 3/ Ten year average not available

TABLE 3
Crops for Processing - Total United States

	Beets	Cabbage	Lima beans 1/ Peas 1/ Spinach	Tomatoes
<u>Acreage</u>				
10 yrs. ave. 1931-1940	7,920	19,610	34,010	273,040
1941	17,790	25,480	62,650	361,390
1942	16,730	15,000	66,080	434,120
1943	17,630	12,840	63,750	433,780
<u>Yield per acre</u>				
10 yrs. ave. 1931-1940	5.81	7.78	.57	.75
1941	7.48	8.99	.61	.96
1942	7.88	10.75	.57	.98
1943	7.87	7.44	.44	.95
<u>Production in</u>				
<u>thousands</u>				
10 yrs. ave. 1931-1940	46.0	152.5	19.5	209.7
1941	133.0	211.0	38.1	345.6
1942	131.9	161.3	37.8	423.9
1943	138.7	95.5	28.3	403.0
<u>Price per unit</u>				
10 yrs. ave. 1931-1940	11.15	7.00	64.43	49.52
1941	13.11	9.70	71.25	48.67
1942	15.17	7.96	84.59	63.71
1943	20.99	21.82	103.21	80.03
<u>Farm value</u>				
10 yrs. ave. 1931-1940	513	1,068	1,257	10,504
1941	1,743	2,047	2,714	16,821
1942	2,001	1,284	3,200	27,007
1943	2,911	2,084	2,925	32,257

1/ Shelled

TABLE 4
Crop Production by States for Fresh Market and Processing - 1942 - Tons

State	Beets		Broccoli ^{1/}		Cabbage ^{1/}		Carrots ^{1/}		Cauliflower ^{1/}		Carrots ^{1/}		Lima Beans		Peas		Spinach ^{1/}		Tomatoes ^{1/}		State Totals							
	Fresh Market	Process.	Fresh	Market	Fresh	Market	Fresh	Market	Fresh	Market	Fresh	Market	Fresh	Market	Fresh	Market	Fresh	Market	Fresh	Market	Fresh	Market						
Maine	-	2/	-	-	-	-	-	-	-	-	-	-	-	-	5,100	-	-	-	-	-	-	5,100						
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
New York	-	47,800	-	-	291,200	80,500	56,950	53,300	-	7,120	2/	9,290	47,340	8,210	49,280	175,000	476,050	117,100	351,140	-	-	-	-					
Pennsylvania	-	12,550	2/	-	60,300	2/	17,000	-	4,220	71,20	1,370	2/	11,250	12,500	162,400	117,100	117,100	175,500	2/	-	-	-						
New Jersey	10,190	8,200	-	-	39,400	2/	10,400	5,000	-	-	-	-	-	-	52,870	225,000	134,700	240,320	-	-	-	-						
West Virginia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Delaware	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Maryland	-	2/	-	-	6,000	2/	-	-	2,700	1,750	180	9,120	1,870	4,200	36,250	324,000	46,650	342,580	66,610	-	-	-	-					
Ohio	-	2/	-	-	32,100	18,400	25,630	-	-	2/	6,350	-	24,200	21,800	82,000	82,000	242,580	-	-	-	-	-	-					
Wisconsin	-	33,800	69,500	34,000	-	25,200	21,000	22,000	-	-	1,200	-	1,200	1,200	-	-	-	-	-	-	-	-						
Illinois	-	2/	-	-	6,400	3,800	1,920	-	-	2/	-	20,150	2,270	-	-	10,100	44,000	59,270	66,250	-	-	-	-					
Indiana	-	1,100	-	-	34,400	5,200	17,250	3,870	-	2/	-	11,470	-	-	-	26,120	567,300	33,450	283,970	-	-	-	-					
Michigan	6,100	-	-	-	4,400	-	-	-	-	1,230	-	11,960	-	-	-	29,680	52,000	65,200	78,090	-	-	-	-					
Missouri	-	2/	-	-	-	-	-	-	-	-	-	-	-	-	3,600	18,950	55,700	26,950	55,700	-	-	-	-					
Kansas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Iowa	-	2/	-	-	10,400	2/	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Nebraska	-	2/	-	-	21,500	1,500	2,250	-	-	-	-	-	-	-	3,270	-	-	-	-	-	-	-						
Minnesota	-	2/	-	-	27,100	2/	3,200	-	3,960	5,60	2,700	630	1,940	8,350	9,400	7,160	124,800	49,150	133,840	-	-	-	-					
Virginia	1,120	2/	-	-	36,300	2/	-	-	-	1,230	2/	1,130	-	-	-	1,700	2/	2/	23,750	38,080	-	-	-					
North Carolina	1,040	2/	-	-	12,600	-	-	-	-	2,620	2/	2,200	-	-	-	10,200	2/	2/	50,240	-	-	-	-					
South Carolina	2,200	-	-	-	13,300	-	-	-	-	1,650	2/	1,850	2/	-	-	6,500	2/	2/	23,040	-	-	-	-					
Georgia	-	-	-	-	108,000	-	-	-	-	5,180	-	3,680	-	-	-	20,740	2/	2/	207,600	-	-	-	-					
Florida	-	-	-	-	4,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Alabama	-	-	-	-	31,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Mississippi	2/	-	-	-	12,800	2/	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Tennessee	-	-	-	-	2,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Louisiana	2,050	2/	-	-	18,100	-	5,620	-	-	2/	-	-	-	-	-	-	-	-	-	-	-	-						
Texas	26,810	2/	-	-	251,500	2/	2,040	-	-	-	-	-	-	-	900	5,910	2/	2/	32,620	-	-	-	-					
Oklahoma	-	2/	-	-	-	-	-	-	-	-	-	-	-	-	6,360	2/	2/	50,590	8,860	-	-	-	-					
Arkansas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,950	25,200	2/	2/	2,940	25,200	-	-	-	-				
New Mexico	-	-	-	-	5,000	-	13,030	16,840	-	2/	-	1,130	14,200	10,070	70,200	11,200	34,440	-	-	-	-	-	-	-				
Colorado	-	-	-	-	50,000	2,300	-	-	-	-	-	-	-	-	300	2/	2/	18,250	21,000	29,250	21,000	-	-	-	-			
Utah	-	2/	-	-	6,300	2/	-	-	-	-	-	-	-	-	23,250	4,540	2/	2/	5,210	22,300	5,310	22,300	-	-	-	-		
Idaho	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,200	3,060	2/	2/	1,230	36,200	10,050	10,050	107,400	-	-	-	-	
Wyoming	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,540	2/	2/	2/	2/	5,920	-	-	-	-	-	-	-	
Montana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
California	-	27,830	81,500	-	198,900	8,120	7,030	2,350	-	2/	37,250	3,550	12,050	22,600	112,100	16,450	19,800	118,426	87,170	-	-	-	-	-	-			
Oregon	-	16,300	6,400	-	3,000	2/	11,500	2,950	-	2/	1,080	40,250	-	1,080	1,250	1,250	1,250	1,250	2/	2/	2/	2/	2/	2/	-	-		
Washington	-	2/	-	-	-	-	-	-	-	-	-	-	-	-	3,250	40,020	5,620	9,500	2/	2/	42,300	43,020	-	-	-	-	-	-
Nevada	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,350	-	-	-	-	-	-	-	-	-	-	-	-	-
Arizona	-	-	-	-	5,000	-	39,200	4,750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other States	-	18,300	-	-	10,500	-	-	-	-	-	-	-	-	-	14,920	-	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Total	55,350	131,900	27,630	1,276,500	163,300	505,140	175,430	3,960	25,180	37,550	96,960	114,400	133,350	111,400	705,400	3,166,400	3,004,700	4,036,140	171,210	-	-	-	-	-	-	-		

1/ Undetermined quantities used for processing

2/ Included in "Other States"

"Commercial Truck Crops," Bureau of Agricultural Economics
(Fresh market converted to tons)

TABLE 5

Estimated Crop Production, 1939 (Tons)
(Supplement to Table 4)

State	Broccoli	Kale	Rutabagas	Turnips
Maine	7	-	72	1,096
New Hampshire	7	-	-	160
Vermont	3	-	9	176
Connecticut	145	80	-	1,480
Massachusetts	40	48	-	3,480
Rhode Island	290	-	-	200
New York	1,069	310	423	4,168
Pennsylvania	2,524	48	1,206	4,256
New Jersey	3,425	128	381	3,208
West Virginia	-	42	9	248
Delaware	528	6	-	88
Maryland	462	1,152	549	2,712
Ohio	46	333	27	6,944
Wisconsin	3	-	1,242	224
Illinois	76	-	9	1,936
Indiana	-	99	27	1,904
Michigan	36	13	1,224	1,648
Missouri	-	150	-	2,328
Kansas	-	10	-	2,104
Iowa	-	-	-	336
Nebraska	3	-	36	328
Minnesota	7	-	7,758	128
North Dakota	-	-	63	16
Virginia	3,105	9,270	1,674	2,632
North Carolina	512	400	72	2,320
South Carolina	983	-	54	3,480
Georgia	7	-	54	16,192
Florida	257	19	144	4,736
Alabama	-	-	81	7,752
Mississippi	-	-	54	8,400
Tennessee	3	890	-	2,520
Kentucky	-	1,882	-	1,312
Louisiana	861	-	63	7,352
Texas	7,240	10	99	18,344
Oklahoma	3	-	-	1,008
Arkansas	3	3	-	2,872
New Mexico	66	-	108	320
Colorado	162	-	180	2,216
Utah	7	-	-	104
Idaho	-	-	72	56
Wyoming	-	-	18	40
Montana	-	-	225	112
California	17,150	51	783	7,160
Oregon	647	70	27	840
Washington	195	61	1,503	1,112
Nevada	-	-	-	16
Arizona	693	-	9	664
Other States	-	29	-	-
Total	40,565	15,104	18,261	130,728

Agricultural Census, 1940.

TABLE 6

Factors Used to Convert Unit Measures to Pounds and Tons

Crop	Unit	Pounds per unit	Tons per unit
Beets	Bushel	52	.026
Broccoli	Crate	42	.021
Carrots	Bushel	50	.025
Cauliflower	Crate	37	.0185
Kale	Bushel	18	.009
Lima beans ^{1/}	Bushel	32	.016
Peas ^{1/}	Bushel	30	.015
Spinach	Bushel	18	.009
Tomatoes	Bushel	53	.0265

^{1/} Unshelled

TABLE 7
Rank of States in Production of Crops for Fresh Market and Processing

TABLE 7 (Continued)

State	Beets	Cabbage	Carrots	Cauliflower	Lima beans	Peas	Spinach	Tomatoes	All crops listed	Process	Fresh
	Process	Fresh	Process	Fresh	Process	Fresh	Process	Fresh	Process	Fresh	Process
Alabama	28	10	18	30	14	9	14	10	32	-	-
Mississippi	-	-	-	-	-	-	-	-	12	-	-
Tennessee	-	-	-	-	-	-	-	-	21	24	-
Kentucky	-	-	-	-	-	-	-	-	31	23	-
Louisiana	5	16	2	-	-	-	-	-	19	-	-
Texas	-	-	-	-	-	-	-	-	2	25	-
Oklahoma	-	-	-	-	-	-	-	-	35	22	-
Arkansas	-	-	-	-	-	-	-	-	-	-	-
New Mexico	26	7	12	16	15	2	14	18	10	28	12
Colorado	-	-	-	-	-	-	-	-	9	29	11
Utah	24	-	-	-	-	-	-	-	18	6	21
Idaho	-	-	-	-	-	-	-	-	1	1	1
California	-	-	-	-	-	-	-	-	1	1	1
Oregon	-	-	-	-	-	-	-	-	22	24	16
Washington	-	-	-	-	-	-	-	-	19	17	-
Nevada	-	-	-	-	-	-	-	-	35	-	-
Arizona	-	-	-	-	-	-	-	-	14	9	-

Based on data in Table 4.

TABLE 8

Canned Pack, 1942 (Cases of 24/2's).

State	Beets	Carrots	Lima beans	Peas	Spinach	Tomatoes			Pulp ^{2/}
						Solid Pack	Juice ^{1/}	Pack	
Maine	-	-	-	252, 912	-	-	-	-	-
New York	2,330, 344	406, 800	-	3, 497, 531	234, 179	1, 544, 287	-	-	82, 605
Maryland	286, 659	123, 425	409, 539	1, 465, 360	-	8, 897, 205	-	-	-
Delaware	-	-	760, 978	-	141, 049 ^{4/}	1, 044, 642 ^{3/}	752, 892	-	71, 194 ^{3/}
New Jersey	132, 545	-	-	-	-	-	350, 241	-	-
Pennsylvania	-	-	-	56, 136 ^{5/}	742, 247	-	883, 672	-	250, 566 ^{5/}
Virginia and West Virginia	-	-	-	-	-	-	-	-	-
Ohio	-	-	44, 754	563, 914	-	-	2, 685, 852	-	-
Indiana	295, 052	-	-	970, 019	-	-	2, 278, 084	-	166, 877
Illinois	-	-	-	1, 783, 832	-	-	-	-	-
Michigan	241, 484	58, 419	107, 416	874, 348	-	-	4, 251, 746	-	714, 316
Wisconsin	1, 755, 575	731, 698	88, 938	12, 478, 490	-	-	-	-	-
Minnesota	-	-	-	2, 762, 915	-	-	-	-	-
Tennessee and Kentucky	-	-	-	-	-	-	1, 463, 624	-	-

^{1/} BREAKDOWN BY STATES NOT AVAILABLE^{2/} CASES OF 6/10'S^{3/} TOTAL FOR MARYLAND AND DELAWARE^{4/} TOTAL FOR DELAWARE AND NEW JERSEY^{5/} TOTAL FOR NEW JERSEY AND PENNSYLVANIA

TABLE 8 (Continued)

State							Tomatoes		
	Beets	Carrots	Lima beans	Peas	Spinach	Solid Pack	Juice ^{1/}	Pulp ^{2/}	
Missouri and Arkansas	-	-	-	-	-	2,549,800	4,227,760	-	-
Texas and Oklahoma	-	-	-	-	-	1,249,643	-	-	-
Montana	-	-	-	374,005	-	-	-	-	-
Colorado	-	-	-	-	-	327,329	-	-	-
Idaho	-	-	-	-	-	-	-	-	-
Utah	13,186	44,335	-	-	2,100,716 ^{6/}	-	-	-	-
Oregon	858,690	350,310 ^{7/}	-	-	-	1,319,981	-	240,020	-
Washington	55,644	-	-	5,553,151 ^{7/}	-	-	-	-	-
California	-	-	-	291,456	3,563,518	7,818,752	-	2,007,122	-
Other States	736,459	567,662	1,059,237	1,404,000	925,001	4,450,357	-	190,195	-
Total	6,705,638	2,282,649	2,526,998	35,255,945	9,566,783	41,251,782	25,177,653	3,749,495	-

^{6/} TOTAL FOR IDAHO AND UTAH
^{7/} TOTAL FOR OREGON AND WASHINGTON

TABLE 9
Frozen Pack, 1942 (Pounds)

Vegetable	East and South	Midwest	West	Total
Broccoli	905,337	68,088	2,249,770	3,223,195
Carrots	192,754	690,208	159,922	1,042,884
Cauliflower	410,539	1,000	788,258	1,199,797
Lima beans	18,601,222	4,609,596	6,192,257	29,403,075
Peas	23,951,841	10,892,633	24,232,689	59,077,163
Peas and carrots	66,538	48,720	941,230	1,056,488
Spinach	10,592,061	312,625	5,670,439	16,575,125
Succotash	37,512	24,054	-	61,566
Miscellaneous ^{1/}	<u>1,828,693</u>	<u>496,358</u>	<u>1,083,184</u>	<u>3,408,235</u>
Total	56,586,497	17,143,282	41,317,749	115,047,528

^{1/} INCLUDES BEETS, COLLARDS, KALE, MIXED VEGETABLES, PEPPERS, PIMENTOS, PUMPKIN, AND TURNIP GREENS

National Association of Frozen Food Packers

TABLE 10

Estimated Dehydrated Pack, 1942 and 1943 (Pounds)

Vegetable	1942	1943
Beets	200,000	2,500,000
Cabbage	400,000	3,000,000
Carrots	2,000,000	20,000,000
Greens	50,000	275,000
Rutabagas	100,000	800,000
Tomato flakes	-	900,000
Tomato juice	<u>750,000</u>	<u>750,000</u>
Total	3,500,000	28,225,000

War Food Administration

TABLE 11

Estimated Farm Weight of Crops Produced for Fresh Market and Processing, 1942 (Tons)

Vegetables	Fresh market	Canned	Dehydrated		Total
			1/	Frozen	
Beets	55,330	134,110	1,300	-	190,740
Broccoli	24,900	-	-	2,930	27,830
Cabbage	1,272,500	2/ 161,300	4,000	-	1,437,800
Carrots	450,530	41,500	12,000	1,410	505,440
Cauliflower	173,430	-	-	2,000	175,430
Greens	-	-	400	-	400
Kale	3,960	-	-	-	3,960
Lima beans	25,180	28,080	-	15,480	88,740
Peas	96,260	371,070	-	30,930	498,260
Peas and carrots	-	-	-	1,430	1,430
Rutabagas and turnips	-	-	600	-	600
Spinach	133,350	119,590	-	15,940	268,880
Succotash	-	-	-	80	80
Tomatoes	705,420	1,736,510	5,250	-	2,447,180
Miscellaneous ^{3/}	-	-	-	3,410	3,410
Total	2,940,860	2,592,160	23,550	73,610	5,630,180

^{1/} SINCE 1942 DEHYDRATION HAS BEEN GREATLY EXPANDED^{2/} SAUERKRAUT^{3/} INCLUDES BEETS, COLLARDS, KALE, MIXED VEGETABLES, PEPPERS, PIMENTOS, PUMPKIN, AND TURNIP GREENS

TABLE 12

Number of Food and Forage Processing Plants in Each State, 1943

State	Food processing plants			Forage driers		
	Canneries	Frozen food packers	Vegetable dehydration plants			
Maine	21	6	9	1	1	1
New Hampshire	1	-	-	-	-	-
Vermont	3	-	-	-	-	-
Connecticut	2	-	1	-	-	-
Massachusetts	2	2	1	-	-	-
Rhode Island	-	-	-	-	-	-
New York	81	53	15	7	6	12
Pennsylvania	24	24	4	6	1	1
New Jersey	11	2	6	-	-	-
West Virginia	20	-	4	-	-	-
Delaware	157	7	4	4	4	4
Maryland	67	10	3	3	1	1
Ohio	98	7	2	2	2	2
Wisconsin	37	127	19	1	1	1
Illinois	127	1	-	-	-	-
Indiana	27	4	1	1	1	1
Michigan	54	1	1	1	1	1
Missouri	1	34	2	2	2	2
Kansas	34	4	2	2	2	2
Iowa	4	15	1	1	1	1
Nebraska	15	-	-	-	-	-
Minnesota	15	-	-	-	-	-
North Dakota	-	-	-	-	-	-
Virginia	158	15	8	4	4	4
North Carolina	15	8	17	1	1	1
South Carolina	8	17	2	2	2	2
Georgia	17	2	2	2	2	2

TABLE 12. (Continued)

State	Food processing plants			Forage dryers
	Canneries	Frozen food packers	Vegetable dehydration plants	
Florida	29	-	3	-
Alabama	6	4	1	2
Mississippi	4	1	1	-
Tennessee	24	4	4	-
Kentucky	19	-	1	-
Louisiana	17	4	5	2
Texas	45	1	8	1
Oklahoma	8	-	1	-
Arkansas	87	-	-	7
New Mexico	12	1	3	-
Colorado	11	-	1	-
Utah	17	6	1	-
Idaho	4	-	9	-
Wyoming	1	-	-	1
Montana	3	-	1	5
California	84	24	29	-
Oregon	35	22	10	-
Washington	30	30	8	1
Arizona	-	-	1	-
Total	1,443	225	159	80

Source:

National Canners Association
 War Food Administration
 Bureau of Plant Industry, Soils and Agricultural Engineering

TABLE I-3

Processing Plants for Various Crops in Each State, 1943

TABLE 13 (Continued)

International Canners Association
Frozen Food Directory - Food Industries, November 1943
War Food Administration

TABLE 14

Estimated Quantity of Vegetable Waste, 1942 (Tons)

Vegetable	Fresh-Market Waste				Processing Waste			
	Field	Packing Plant	Total	Field	Vinery	Canning	Dehydrat ^{1/} ion	Freezin ^g
Beets	3,320	1,660	4,980	37,920	-	40,230	390	-
Broccoli	14,940	9,960	24,900	1,760	-	-	1,320	3,080
Cabbage	1,272,500	-	1,272,500	165,300	-	32,260	1,040	-
Carrots	31,540	45,050	76,590	20,320	-	8,300	3,000	890
Cauliflower	346,860	8,670	355,530	4,000	-	-	1,400	5,400
Greens	-	-	-	-	-	70	-	70
Kale	-	-	-	-	-	-	-	-
Lima beans	67,140	1,260	68,400	-	264,320	1,400	-	850
Peas	212,940	-	212,940	-	1,736,480	18,550	-	1,700
Peas and carrots	-	-	-	530	-	-	-	900
Rutabagas and turnips	-	-	-	150	-	70	-	220
Spinach	-	2,670	2,670	-	-	23,920	-	7,650
Succotash	-	-	-	-	-	-	50	50
Tomatoes	-	105,810	105,810	-	-	306,820	260	-
Miscellaneous ^{2/}	-	-	-	-	-	-	1,700	1,700
Total	1,949,240	175,080	2,124,320	229,980	2,000,800	431,480	4,830	16,460
								2,683,550

^{1/} SINCE 1942, THE DEHYDRATION HAS BEEN GREATLY EXPANDED
^{2/} INCLUDES BEETS, COLLARDS, KALE, MIXED VEGETABLES, PUMPKIN, PIMENTOS, PEPPERS, AND TURNIP GREENS

TABLE 15
Seasonal Availability of Crops

Region	Peak of Season							
	Beets	Broccoli	Cabbage	Carrots	Cauliflower	Kale	Lima Beans	Peas
Northeast 1/	July-Oct.	Sept.-Oct.	June-Nov.	Aug.-Nov.	Sept.-Nov.	May-June Sept.-Nov.	Aug.-Sept.	June-July Oct.-Jan.
Great Lakes 2/	June-Aug.	Sept.-Oct.	July-Oct.	Aug.-Nov.	Oct.		Aug.	June Oct.
Midwest 3/	July-Aug.		July-Sept.	July-Aug.			July-Sept.	
Southern 4/	June	Feb.-May	Apr.-May Sept.-Oct.	May-July	Dec.-Feb.	June-Aug.	Apr.-May	Mar.-Apr.
Southwest 5/	Mar.-Apr.	Feb.	Feb.-Apr.	Jan.-May	Dec.-Jan.	June-July	Apr.	Feb.-Mar.
Rocky Mt. 6/	July-Aug.	Aug.-Sept.	Oct.	Aug.	Aug.-Sept.		Aug.	July-Aug.
Pacific 7/	Year around	Oct.-Feb.	Mar.-Apr.	Mar.-June	Sept.-Feb.	July-Sept.	Feb.-May	Sept.-Oct.
							Jan.-May	May-Sept.

1/ Me., N.H., Vt., Conn., Mass., R.I., N.Y., Pa., N.J., W. Va., Del., Md.

2/ O., Wis., Ill., Ind., Mich.

3/ Mo., Kans., Iowa, Neb., Minn., N. Dak., S. Dak.

4/ Va., N.C., S.C., Ga., Fla., Ala., Miss., Tenn., Ky.

5/ La., Tex., Okla., Ark.

6/ N. Mex., Colo., Utah, Idaho, Wyo., Mont.

7/ Calif., Oreg., Wash., Nev., Ariz.

TABLE 16

Opening and Closing Dates of Packing Season

State	Beets	Cabbage	Carrots	Lima beans	Peas	Spinach	Tomatoes
New York	Aug. 1 Dec. 31	Sept. 1 May 1	Sept. 15 Dec. 31	June 20 Aug. 1	June 5-Sept. 20-Oct.	28 18	Aug. 20 Oct. 15
Pennsylvania				June 1 July 10	June 20-Oct.	18	Aug. 10
New Jersey	June 1 July 31			May 20 June 10	Apr. 1-May Oct. 20-Nov.	31 30	July 15 Oct. 15
West Virginia					Aug. 1		
Delaware				Aug. 5 Oct. 10	May 25 June 10	July 20 Oct. 15	
Maryland	June 1 July 15	Oct. 1 Feb. 1		May 20 July 15	Apr. 1-May Nov. 1-Nov.	31 30	July 15 Oct. 15
Ohio	July 20 Nov. 30	July 15 Nov. 20		May 28 July 4			
Wisconsin	July 20 Nov. 30	July 15 Nov. 20	July 25 Nov. 20	June 15 Aug. 20	May 20-June Sept. 10-Nov.	20 1	Aug. 10 Oct. 15
Illinois				Aug. 15 Sept. 15	June 3 July 30		
Indiana	Sept. 15 Oct. 15	Year around		May 1 June 1	15-June Oct. 1-Oct.	15 25	Aug. 15 Oct. 15
Michigan	Aug. 1 Nov. 20	Sept. 10 Dec. 31	Oct. 1 Nov. 25	June 25 Aug. 1	10-July Sept. 20-Oct.	1 20	Aug. 15 Sept. 30
Missouri				June 1 July 15	May 1 June 15		
Kansas				May 15 June 15	June 1 July 1		
Iowa				June 10 July 15	July 1 Aug. 10		
Nebraska							
Minnesota	July 20 Nov. 30			June 15 Aug. 15			Oct. 1
Virginia				(Aug. 1 (Oct. 10)	May 15 June 15	Apr. 1- Oct. 15-	May 25 July 30 Oct. 15

TABLE 16. (Continued)

State	Beets	Cabbage	Carrots	Lima beans	Peas	Spinach	Tomatoes
North Carolina							July 1 Aug. 15
South Carolina							June 15 July 15
Florida							Mar. 1 May 1
Tennessee	July 10 Aug. 15	Year around	Aug. 15 Sept. 30	May 15 June 15	Apr. 25-June 1 Sept. 15-Oct. 10		Aug. 1 Oct. 15
Kentucky	July 10 Aug. 15	Year around	Aug. 15 Sept. 30	May 15 June 15	Apr. 25-June 1 Sept. 15-Oct. 10		Aug. 1 Oct. 15
Louisiana						June 1	
Texas						July 1	May 15-Aug. 1 Dec. 1-Jan. 15
Oklahoma					May 15 June 15	Apr. 1-May 15 Oct. 15-Dec. 31	
Arkansas					July 1 Nov. 15	Apr. 1-May 15 Oct. 15-Dec. 31	Aug. 1 Oct. 15
New Mexico							Aug. 15 Oct. 15
Colorado			Oct. 1 Jan. 15		June 15 Aug. 1		Aug. 15 Oct. 15
Utah	June 1 Oct. 15	Oct. 1 Jan. 15	Aug. 15 Oct. 15	Aug. 5 Oct. 1	June 10 Aug. 10		Aug. 15 Oct. 15
Idaho					June 1 July 20		Aug. 20 Oct. 15
Wyoming	July 1 Sept. 25		(Sept. 1 (Sept. 30	Aug. 15 Sept. 15	July 1 Aug. 25		Sept. 10 Sept. 25
Montana		Oct. 15 Jan. 1			July 1 Aug. 20		
California	May 5 Dec. 20			Sept. 1 Oct. 31	Apr. 10 June 30	Feb. 20-May 10 Oct. 1-Dec. 15	July 10 Nov. 10
Oregon	July 1 Oct. 15	Nov. 15 Feb. 28	Aug. 20 Oct. 15		June 10 July 31	Sept. 1 Oct. 15	Aug. 15 Oct. 1
Washington	July 1 Oct. 15	Nov. 15 Feb. 28	Aug. 20 Oct. 15		June 10 July 31	Sept. 1 Oct. 15	Aug. 15 Oct. 1

TABLE 17

Forage Driers in Operation, 1942

(Partial List)

<u>User</u>	<u>Product dried</u>	<u>Make</u>	<u>Manufacturer</u>
<u>Arkansas</u>			
Chapman & Dewey Marked Tree	Alfalfa	Ardrier	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.
F. P. Jacobs Grider	Alfalfa	Ardrier	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.
Luxora Gin Co. Luxora	Alfalfa	Homemade	
Ohlendorf-Cromer Co. R. #1, Osceola	Alfalfa	Ardrier	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.
Ralston-Purina Osceola	Alfalfa	Ardrier	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.
Lee Wilson & Co. Armored	Alfalfa and some sigrain	Arnold	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.
<u>California</u>			
Balfour-Guthrie Co. Calipatria	Finishing hay	Homemade	
Mealfalfa Co. Dixon	Alfalfa	Ardrier	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.
Poultry Producers of Central California, 84 Battery Street San Francisco			
Plants located at Gerber	Alfalfa	Western Con- densing Co.	
Vorden	Alfalfa	" "	
Ryer Island	Alfalfa	" "	
<u>Connecticut</u>			
Geo. Pratt, Jr. New Milford	Hay	Homemade	
<u>Georgia</u>			
University of Georgia Athens			
<u>Illinois</u>			
Wells & Scott Monmouth		Arnold	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.
The Western Alfalfa Meal Co. Belleville		Arnold	Arnold Dryer Company 1200 Montana Ave., Milwaukee, Wis.

TABLE 17 (Continued)

User	Product dried	Make	Manufacturer
<u>Indiana</u>			
Dwiggins & Sons Alfalfa Mills, New Paris			
Lewis F. Rauth Boonville		T. V. A. plans	
Rush Co. Alfalfa Dehydrating Alfalfa and Coop., Rushville	soybeans	Randolph	O. W. Randolph Co. Toledo, Ohio
<u>Kansas</u>			
W. J. Small Neodasha	Alfalfa	Ardrier	Arnold Dryer Co. 1200 Montana Ave., Milwaukee, Wis.
<u>Louisiana</u>			
Godchaux Sugars, Inc. Reserve	Drying sugar and bagasse to make Servall litter	Ardriers (2)	Arnold Dryer Co. 1200 Montana Ave., Milwaukee, Wis.
<u>Maryland</u>			
Cold Saturday Farm Finksburg	Alfalfa and dry chopped corn stalks	Homemade	
R. L. Forrest, Java Farm R.F.D., Edgewater	Alfalfa	Homemade	
Indian Springs Farm Darlington	Alfalfa	Homemade	
<u>Michigan</u>			
O. W. Randolph Expt. Plant Erie		Randolph	O. W. Randolph Co. Toledo, Ohio
<u>Minnesota</u>			
Mr. Lanby Swift	Alfalfa for meal		
Morin Farms Alden	Alfalfa for meal	Ardrier	Arnold Dryer Co. 1200 Montana Ave., Milwaukee, Wis.
<u>Missouri</u>			
Clark Bros.	Alfalfa	Ardrier	Arnold Dryer Co. 1200 Montana Ave., Milwaukee, Wis.
Pecos Valley Alfalfa Mill Co., Wyatt		Arnold	Arnold Dryer Co. 1200 Montana Ave., Milwaukee, Wis.
St. Albans Farms Becker	Alfalfa		

TABLE 17 (Continued)

<u>User</u>	<u>Product dried</u>	<u>Make</u>	<u>Manufacturer</u>
<u>Missouri</u>			
Delta Alfalfa Products Co. c/o J. B. Voskamp, P.O. Box 173, Greenville		L. R. Christie	
Trail Lake Plantations Trail Lake		L. R. Christie	
<u>Montana</u>			
Montana Land & Water Co. Valier		Randolph	O. W. Randolph Co. Toledo, Ohio
<u>Nebraska</u>			
Denver Alfalfa Milling & Products Co., Lanar, Colo. Dry at Lexington & Cozad	Alfalfa	Commercial	
L. L. Coryell Co. Lincoln	Alfalfa	Commercial	
<u>New Jersey</u>			
Walker-Gordon Co. Plainsboro		Ardrier	Arnold Dryer Co. 1200 Montana Ave., Milwaukee Wis.
Walker-Gordon Lab. Co. Juliustown	Agricultural American products	Process	American Process Company 55 Park Place, New York City
<u>New York</u>			
Ashgrove Farm Saratoga Springs	Hay for feed	Arnold	Arnold Dryer Co. 1200 Montana Ave., Milwaukee Wis.
Genesee Valley Alfalfa Corp. Geneseo		Randolph	O. W. Randolph Co. Toledo, Ohio
Genesee Valley Alfalfa Corp. Avon		Randolph	O. W. Randolph Co. Toledo, Ohio
Leroy Alfalfa Corp. Leroy		Randolph	O. W. Randolph Co. Toledo, Ohio
Jesse Moulton, Avon Avon) Leroy) Geneseo)	Hay for alfalfa feed		
<u>Ohio</u>			
Arnold Dehydrating Co. Napoleon			
Chas. Ackerman Mechanicsburg			
A. B. Caple Co. Toledo & Tontogany	Agricultural Fulmer products		Fulmer Alfalfa Dryer Co. Nazareth, Pa.

TABLE 17 (Continued)

<u>User</u>	<u>Product dried</u>	<u>Make</u>	<u>Manufacturer</u>
Ohio (Continued)			
Central Mills			
Dunbridge			
Cooperative Dehydrating Co.		Randolph	O. W. Randolph Co.
Payne			Toledo, Ohio
Early & Daniel Co.			
Cincinnati			
Farm Industries, Inc.			
DeGraff			
Sherman Hart			
Hicksville			
Hayward, Inc.			
Oak Harbor			
Larro Milling Co.			
Fremont			
Logan County Dehydrators			
West Liberty			
O'Brien Milling Co.			
Greenville			
Ohio Sugar Co.			
Ottawa			
Pecos Valley Milling Co.			
Toledo			
Randolph Alfalfa Co.			
2917 Imlay St.			
Toledo			
Rohloff Bros., Inc.			
Graytown			
Saunders Mill, Inc.			
Box 192, Toledo			
Snyder's Milling Ser.			
Marengo			
Weaver & Son			
Hoytville			
Chas. B. Wing			
Mechanicsburg			
Zeigler Milling Co.			
Bucyrus			

TABLE 17 (Continued)

<u>User</u>	<u>Product dried</u>	<u>Make</u>	<u>Manufacturer</u>
<u>Pennsylvania</u>			
Green Acres Nazareth	Agricultural products	Fulmer	Fulmer Alfalfa Dryer Co. Nazareth, Pa
Keystone Dehydrat- ing Co., Nazareth	Agricultural products	Fulmer	Fulmer Alfalfa Dryer Co. Nazareth, Pa.
Meadow Brook Farms Nazareth	Agricultural products	Fulmer	Fulmer Alfalfa Dryer Co. Nazareth, Pa.
Schoeneck Farms Nazareth	Alfalfa	Proctor & Schwartz	Proctor & Schwartz 7th St. & Tabor Rd., Phila., Pa.
Trexler Farms Allentown	Agricultural products	Fulmer	Fulmer Alfalfa Dryer Co. Nazareth, Pa.
White Swan Farms Erie		Randolph	O. W. Randolph Co. Toledo, Ohio
<u>Texas</u>			
Waldo Milling Co. Bryan	Alfalfa hay some green oats	Ardrier	Arnold Dryer Co. 1200 Montana Ave., Milwaukee, W
<u>Virginia</u>			
I. C. Choate Sugar Grove	Clover		
Royster Guano Co.	Agricultural products	American Process	American Process Co. 55 Park Place, New York City
R. F. Stevens Radford	Alfalfa		
Virginia Poly. Inst. Blacksburg	Clover		
<u>Washington</u>			
Chris Knudsen Burlington	Alfalfa		

TABLE 18

Acreage and Production of Alfalfa Hay, 1930-1945

State	Acreage			Production		
	Average 1930-39	1941	1942	Average 1930-39	1941	1942
	Thousand acres			Thousands tons		
Maine	6	6	7	9	8	9
New Hampshire	3	4	5	6	6	10
Vermont	11	16	19	25	29	46
Connecticut	13	20	24	25	48	59
Massachusetts	6	13	15	17	27	41
Rhode Island	1	1	1	12	12	12
New York	428	505	460	513	749	897
Pennsylvania	1,281	1,289	1,268	1,322	506	592
New Jersey	41	62	66	63	89	132
West Virginia	18	43	47	47	127	145
Delaware	6	4	4	5	34	106
Maryland	31	39	40	40	90	89
Ohio	384	486	515	448	70	10
Wisconsin	762	1,255	1,167	969	70	10
Illinois	377	582	617	494	1,058	1,058
Indiana	340	476	519	452	833	833
Michigan	930	1,295	1,334	1,227	1,813	1,813
Missouri	186	328	340	320	853	853
Kansas	658	580	708	722	1,247	1,247
Iowa	746	1,055	1,139	991	1,504	1,504
Nebraska	1,043	632	777	746	2,426	2,426
Minnesota	928	1,322	1,441	1,412	1,583	1,583
North Dakota	178	131	179	181	1,106	1,106
South Dakota	467	211	270	286	1,276	1,276
Virginia	55	54	60	62	103	103
North Carolina	7	7	7	12	13	13
South Carolina	12	12	5	5	5	5
Georgia	5	5	5	5	9	10

TABLE 18. (Continued)

State	Acreage			Production			
	Average 1930-39		1941	1942	1943	Average 1930-39	1941
			Thousand acres				Thousand tons
Florida	4	5	6	5	5	9	8
Alabama	47	65	66	68	105	150	152
Mississippi	43	84	100	115	70	160	205
Tennessee	135	182	206	206	217	328	433
Kentucky	18	35	28	29	38	74	59
Louisiana	74	146	124	135	167	365	347
Texas	240	298	298	280	407	670	670
Oklahoma	68	90	90	81	125	207	202
Arkansas	89	140	135	136	211	378	359
New Mexico	677	646	652	632	1,265	1,389	1,369
Colorado	469	444	453	426	962	1,043	997
Utah	779	780	788	772	1,886	1,911	1,852
Idaho	371	324	324	310	545	567	535
Wyoming	671	650	696	682	1,061	1,202	1,253
Montana	746	780	819	868	3,038	3,198	3,440
California	256	303	291	282	640	773	728
Oregon	236	330	320	330	593	858	819
Washington	137	137	138	137	296	329	345
Nevada	155	186	181	206	446	474	489
Arizona							587
Total	12,867	14,963	15,814	14,983	24,907	32,388	36,478
							32,465

TABLE 19

Alfalfa Meal, Sun Cured and Dehydrated. Production by Groups of States and by Regions, 1941-1943

States and regions	Sun cured			Dehydrated		
	1943		Total	1942		1943
	First	Second	half	First	Second	half
	Tons	Tons	Tons	Tons	Tons	Tons
N. Y., Pa., Md.	--	--	--	--	32,770	15,775
Miss., Ark.	--	329	--	--	9,158	4,615
Okla., Texas	15,139	14,579	6,811	7,088	13,899	17,411
Mich., Minn.	2,871	3,868	2,540	2,314	4,854	5,428
Ohio, Ind., Ill.	27,181	37,082	26,344	20,000	46,344	31,584
Iowa, Mo.	2,516	7,125	6,960	3,568	10,528	24,493
Nebr., Kans., Colo.	105,862	138,961	63,592	64,367	127,919	52,553
Wash., Idaho, Ariz., Utah, Nev., N. Mex.	10,275	7,587	1,775	1,775	3,450	1,327
California	25,661	35,888	21,194	18,368	18,968	37,336
Total	209,362	269,167	147,444	143,543	290,987	181,434
					276,944	100,320
					141,887	242,207

AAA regions 1/

Northeast and East Central	--	--	--	26,873	32,770	6,514	15,775	22,289
South	15,139	14,908	6,811	7,088	13,899	21,460	13,943	23,997
North Central	133,294	176,889	96,026	86,671	182,691	101,700	139,772	119,236
West	60,929	77,370	44,613	49,784	94,397	31,401	75,479	76,685

1/ The Northeast region includes the New England States, New York, Pennsylvania, and New Jersey. The East Central region includes Delaware, Maryland, Virginia, West Virginia, North Carolina, Kentucky, and Tennessee. The South includes the Southern States, including Oklahoma and Texas. The North Central region includes the three Lake States, the five Corn Belt States, and South Dakota and Nebraska. North Dakota and Kansas are included in the Western region.

TABLE 19. (Continued)

States and regions	Firms reporting	1941	1942	Total		1943	Second half	Total estimated	Tons				
				First half									
				Tons	Tons								
N.Y., Pa., Md.	8	26,873	32,770	6,514	15,775								
Miss., Ark.	9	11,350	17,740	9,158	4,615	22,289	13,773						
Okla., Texas	6	25,249	26,091	11,596	12,527								
Mich., Minn.	5	8,299	11,395	3,952	6,357	24,123							
Ohio, Ind., Ill.	9	58,765	94,414	45,906	43,740								
Iowa, Mo.	9	27,009	38,000	18,001	18,682	39,646							
Nebr., Kans., Colo.	9	158,415	199,505	85,991	86,683								
Idaho, Wash.	3	11,602	9,719	2,888	101,994	187,985							
Ariz., Utah, Nev., N. Mex.	4	24,787	32,564	23,409	3,025								
California	13	38,447	83,913	40,349	22,609	46,018							
Total	75	390,796	546,111	247,764	285,430	533,194							
AAA regions 1/ Northeast and East Central													
South	8	26,873	32,770	6,514	15,775								
North Central	15	36,599	43,831	20,754	17,142	22,289							
West	28	234,994	316,661	145,448	156,479	37,896							
	24	92,330	152,849	75,048	96,034	301,927							
						171,082							

TABLE 20

Alfalfa Meal - Destination of 1942 Shipments, by Groups of States

States in which produced	State of destination										
	New England:	N. Y., Pa.	Del., Md.	W. Va., Pa.	N. C., Ky.	S. C., Fla.	Ark., Miss.	Tenn. Ala.	Okl., La., Tenn.	Mich., Wis., Minn.	Ohio, Ind., Ill.
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
N. Y., Pa., Md.	\$2,510	\$22,715	4,699	2,112	--	--	--	--	--	--	--
Miss., Ark.	3,050	\$2,934	1,390	3,021	2,154	525	--	--	100	\$2,400	
Okla., Texas	\$261	335	--	55	90	582	22,970	\$266		505	
Mich., Minn.	231	\$2,031	63	148	--	--	--	--	5,839	1,186	
Ohio, Ind., Ill.	4,116	\$20,448	1,985	8,252	1,180	50	60	1,519	\$29,299		
Iowa, Mo.	547	6,525	1,531	4,232	2,656	409	--		355	10,149	
Nebr., Kans., Colo.	1,386	\$12,525	850	14,900	8,709	10,268	7,795	23,681		30,022	
Idaho, Wash.	--	--	55	100	50	--	--	700		533	
Ariz., Utah, Nev., N. Mex.	\$25	949	55	580	\$2,946	143	4,563	1,758	\$2,409		
California	--	\$235	--	--	--	--	--	--	--	380	
Total	\$2,126	78,697	10,628	33,400	17,785	11,977	35,388	54,218	76,883		

TABLE 20 (Continued)

States in which produced	States of destination ^{1/}							Total
	Iowa, Mo.	N. Dak., S. Dak., Nebr., Kans.	Mont., Wyo., Colo.	Wash., Oreg., Idaho	Nev., Utah, Ariz., N. Mex.	California		
Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	
N. Y., Pa., Md.	---	---	---	---	---	---	---	32,036
Miss., Ark.	222	2,083	---	---	---	---	---	17,879
Oklas., Texas	741	205	---	---	---	---	---	26,010
Mich., Minn.	879	220	---	---	---	---	---	10,597
Ohio, Ind., Ill.	290	20	30	25	---	---	---	77,274
Iowa, Mo.	(8,979)	145	---	---	---	---	125	35,553
Nebr., Kans., Colo.	30,721	(45,168)	(8,754)	30	20	---	---	194,829
Idaho, Wash.	1,010	725	185	(3,817)	575	1,869	9,619	
Ariz., Utah, Nev., N. Mex.	2,234	1,331	---	3,646	(925)	10,725	32,289	
California	---	---	---	2,458	35	(78,477)	81,585	
Total	45,076	49,897	8,969	9,976	1,555	91,096	519,784	

^{1/} Figures in parenthesis represent tons of feed used in the group of States in which the feed was mixed.

TABLE 21
Estimated Yields of Dried Vegetable Wastes

<u>Raw material</u>	<u>Yields, percent of raw material</u>	
	Leaves	Leaves and stems
Beet tops	6-8	12-15
Broccoli-leaf waste	7-8	13-16
Carrot tops	11-12	20
Kale	10	18
Lima bean leaf fraction (from viner apron)	23	28
Pea vines (from viner)	-	15-19
Turnip tops	6-8	15-17
Spinach	8	12

Based on results of preliminary pilot-plant tests at this Laboratory

TABLE 22

Nutrients in Certain Dried Materials

Material	Protein		Crude Fiber		Fat % Leaves	Carotene		Riboflavin Micrograms/gm. Leaves Stems
	Leaves %	Stems %	Leaves %	Stems %		Leaves Micrograms/gm.	Stems Micrograms/gm.	
Alfalfa	20	-	18	-	2-3	150	-	15
Beets	32	17	6	13	6	460	37	17
Broccoli	33	-	10	-	6	670	-	6
Cabbage (Savoy)	22	-	8	-	5	295	-	-
Carrots	18	10	9	17	4	274	122	9
Cauliflower	27	17	9	17	4	185	28	23
Kale	27	16	7	10	6	266	25	16
Lima beans	18	12	10	27	4	176	-	8
Rutabagas	31	18	6	15	6	257	13	21
Turnips	30	18	8	10	4	264	54	15
Spinach	32	22	7	9	4	314	120	15
								8

Vegetable Wastes as Animal Feedstuffs, by E. G. Kelley and M. E. Wall. Feedstuffs, vol. 15, no. 26, p. 18, 1943.

Feedstuffs,

TABLE 23
Estimated Feed Requirements and Supply for 1944

<u>Class of Livestock</u>	Quantity Required for 1944 in 1000 Tons			
	<u>Grains and millfeed</u>	<u>High protein feed</u>	<u>Total conc. feeds</u>	<u>Alfalfa hay</u>
Chickens	24,028	3,151	27,179	264.9
Others	107,652	10,963	118,615	452.5
Total	131,680	14,114	145,794	717.4
Available	117,226	10,580	127,806	
Shortage	14,454	3,534	17,988	
Per cent	11.0	25.0	12.3	

Feed Supply Still below Needs, 1944 Survey by Council Reveals, Feedstuffs, vol. 16, no. 6, p. 1, February 5, 1944.

TABLE 24

Production of Mixed Feed and Alfalfa Meal, 1941, 1942 and 1943

Feed	1941		1942		1943	
	Tons	%	Tons	%	Tons	%
Poultry	5,763,291		7,684,525		57.6	
Dairy	2,856,225		3,484,367		26.1	
Other	1,419,999		2,184,503		16.3	
Total	10,034,225		13,353,395		100.0	
Alfalfa meal	389,396		546,111		4.1	

1/ Estimated.

TABLE 25

Distribution of Mixed Feed and Alfalfa Meal, 1942

Area of destination	Mixed Feed			Alfalfa Meal	
	Poultry		Dairy	Other	Total
	Tons	%	Tons	Tons	Tons
Northeast	2,098,580	28.2	1,297,634	359,289	3,755,503
North Central	1,679,693	22.6	575,522	1,063,659	3,318,874
Southern	2,637,265	35.5	1,010,537	899,423	4,547,225
Western	1,009,368	13.6	183,865	147,396	1,340,629
Unknown	4,148	.1	9,278	62,075	75,501
Total	7,429,054	100.0	3,076,836	12,531,842	13,037,732
Percent	57.0		23.6	19.4	100.0
					4.0

Commercial Feed Production, Feedstuffs, December 25, 1943.

TABLE 26

Number of Chickens in the United States, 1942 and 1943 (Thousands)

State	1942	1943	State	1942	1943
Maine	2,250	2,606	Virginia	9,604	10,215
New Hampshire	1,874	2,099	North Carolina	12,068	14,156
Vermont	960	1,134	South Carolina	4,978	5,476
Connecticut	2,997	3,417	Georgia	9,159	10,244
Massachusetts	4,435	5,094	Florida	2,657	2,970
Rhode Island	504	548	Alabama	9,136	10,190
New York	14,331	16,218	Mississippi	8,569	9,705
Pennsylvania	20,547	23,346	Tennessee	11,446	13,562
New Jersey	7,717	8,984	Kentucky	12,258	14,517
West Virginia	4,426	4,937	Louisiana	6,105	6,801
Delaware	1,304	1,322	Texas	31,681	36,975
Maryland	4,193	4,412	Oklahoma	13,417	15,930
Ohio	22,711	24,578	Arkansas	9,719	10,929
Wisconsin	16,919	18,471	New Mexico	1,227	1,565
Illinois	23,707	26,832	Colorado	3,918	4,585
Indiana	16,545	18,645	Utah	2,505	2,663
Michigan	13,125	14,088	Idaho	2,607	2,816
Missouri	25,444	28,558	Wyoming	875	1,007
Kansas	17,264	20,338	Montana	2,297	2,661
Iowa	36,912	41,016	California	16,688	17,765
Nebraska	15,338	19,308	Oregon	3,710	4,039
Minnesota	24,342	29,297	Washington	6,698	6,979
North Dakota	5,580	7,083	Nevada	284	284
South Dakota	9,197	10,964	Arizona	678	778
			Total	474,910	540,107

Bureau of Agricultural Economics.

COMMERCIAL PRODUCTION OF 26 TRUCK CROPS

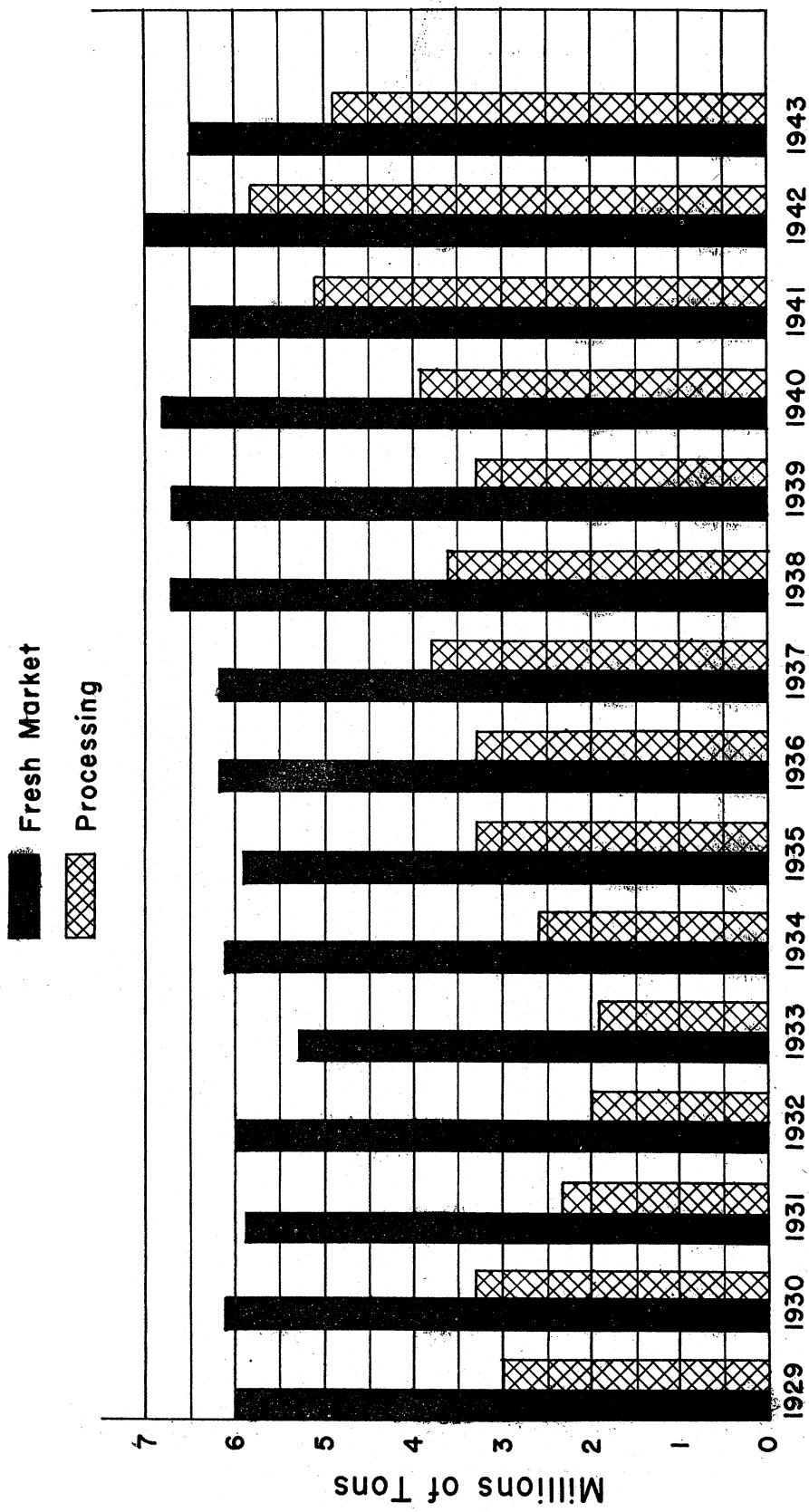


Figure 1

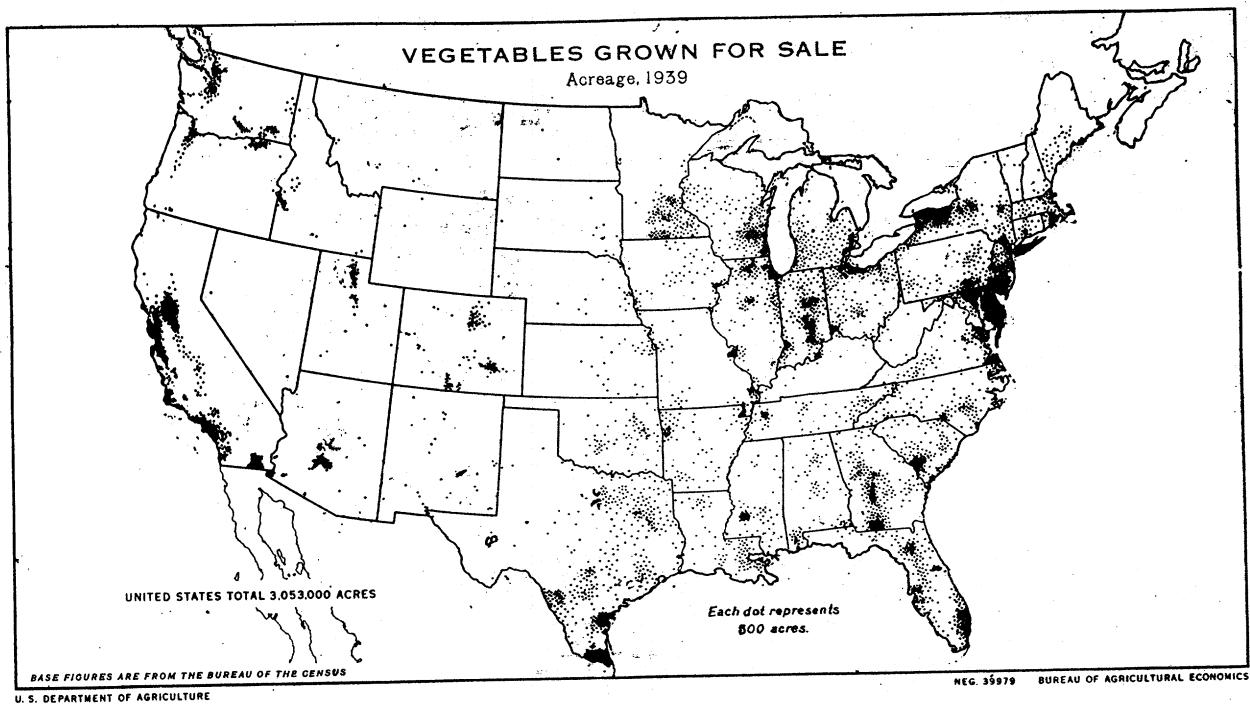


Fig. 2

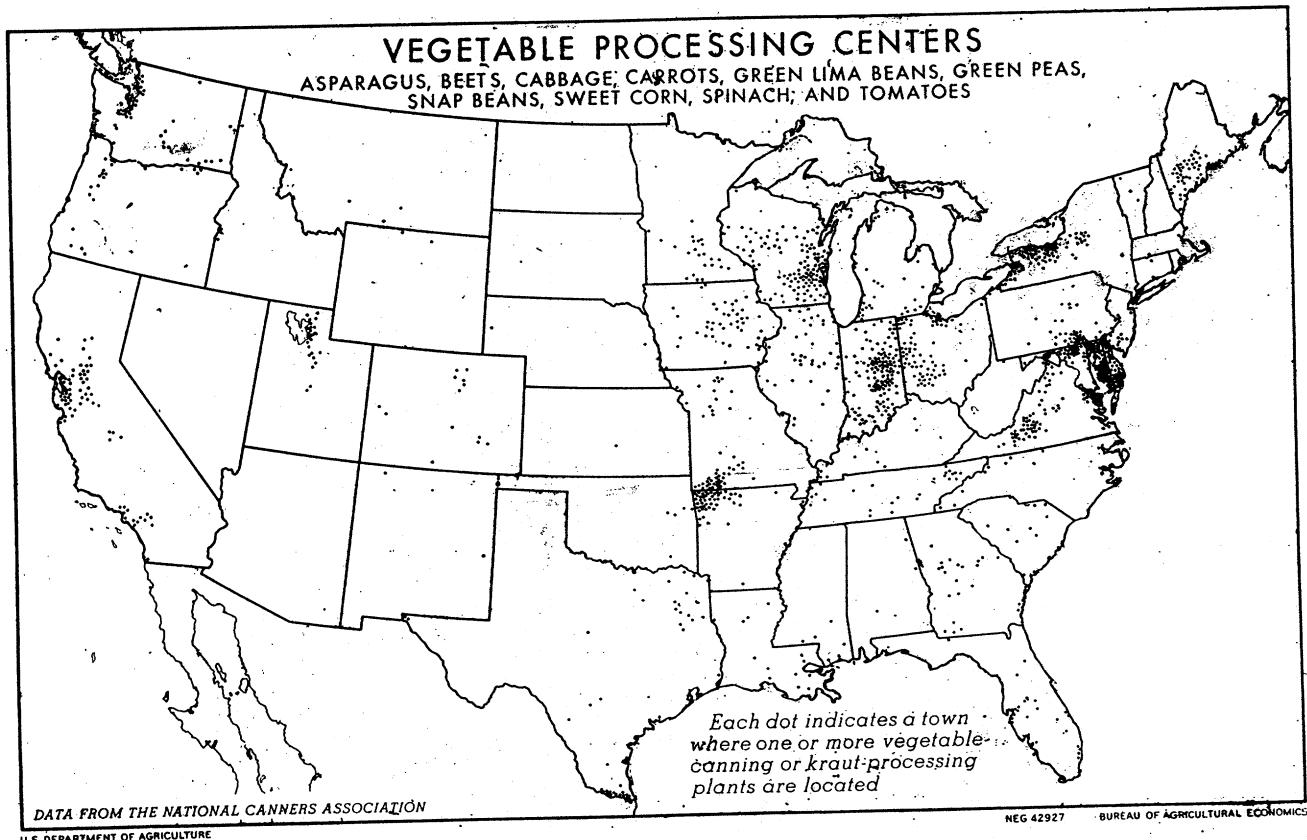


Fig. 3

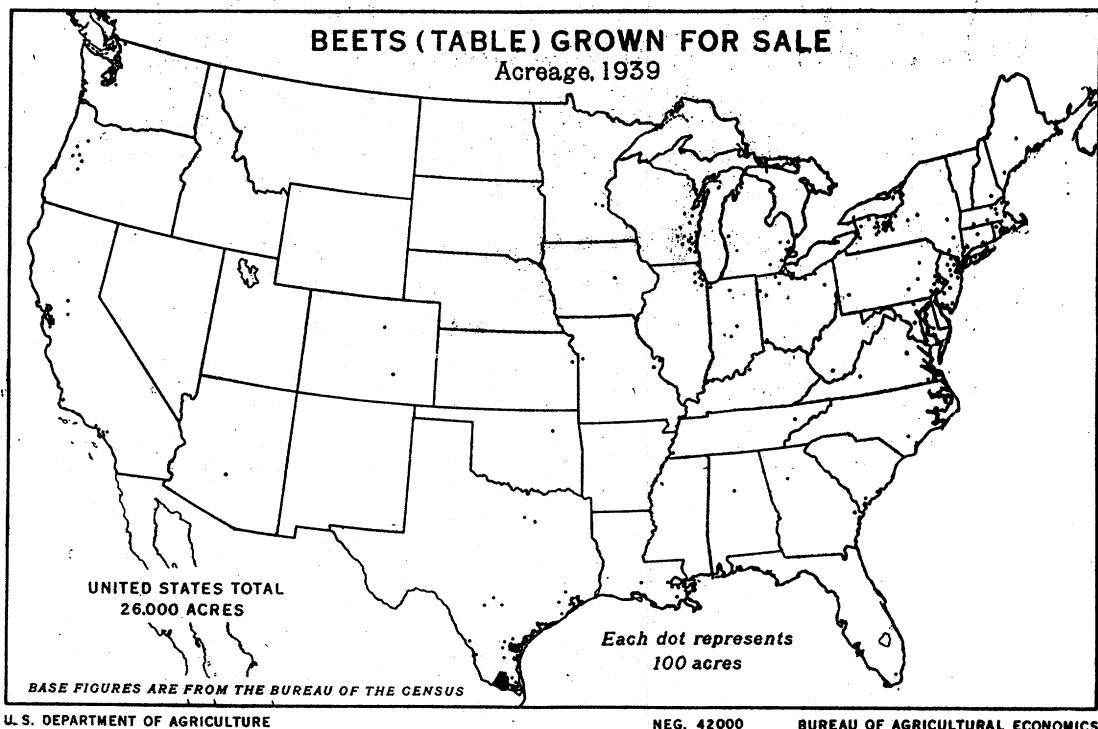


Fig.4

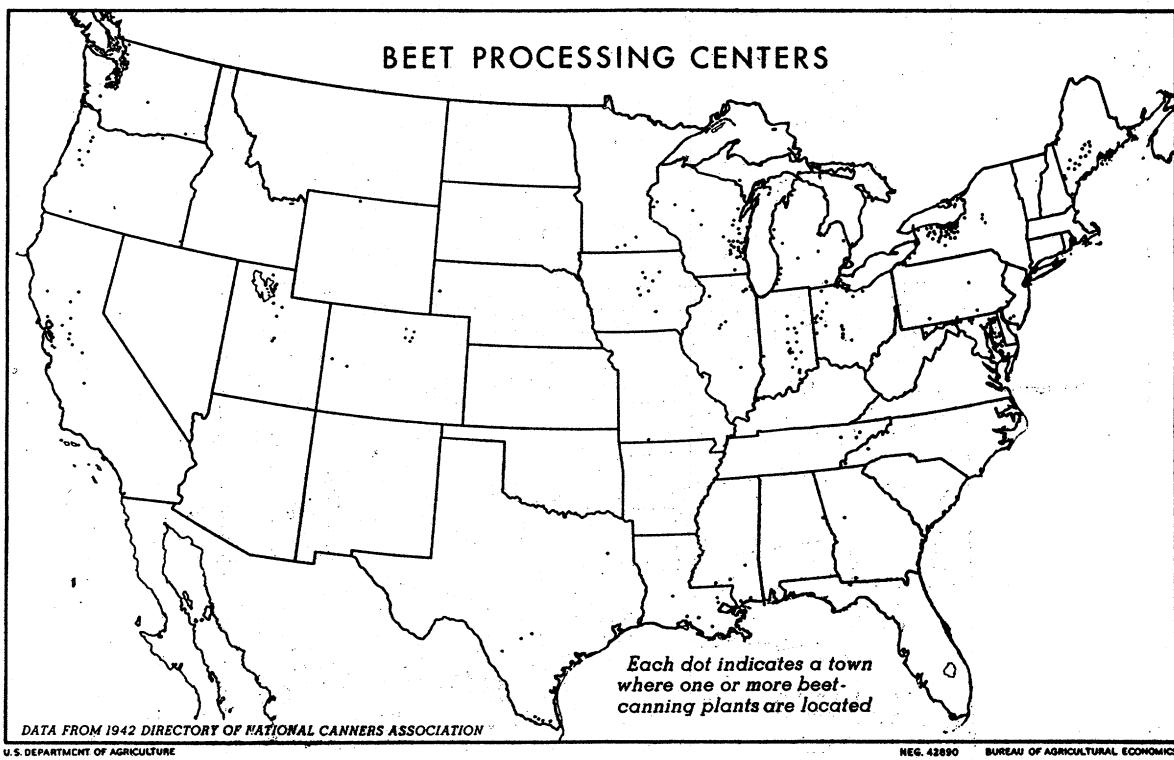


Fig.5

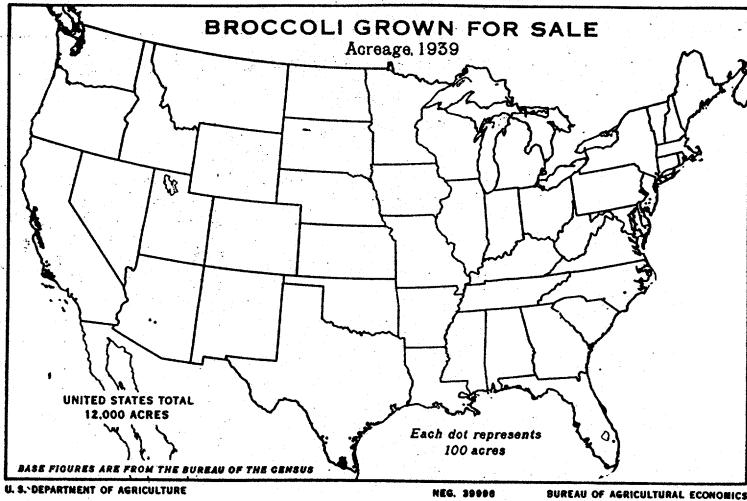


Fig.6

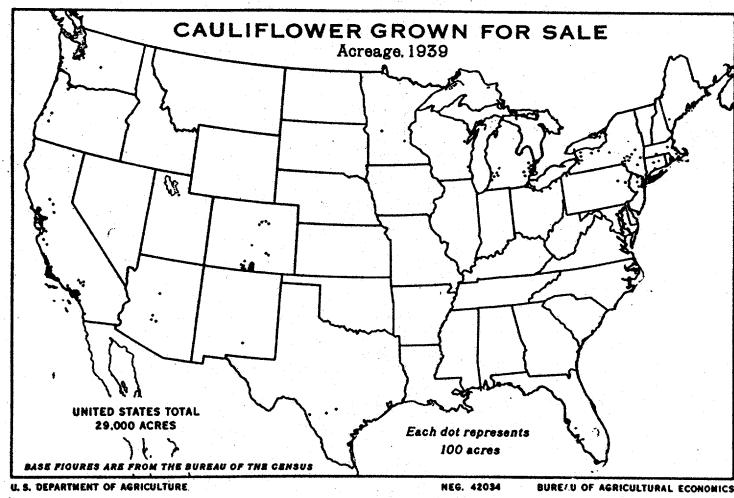


Fig.7

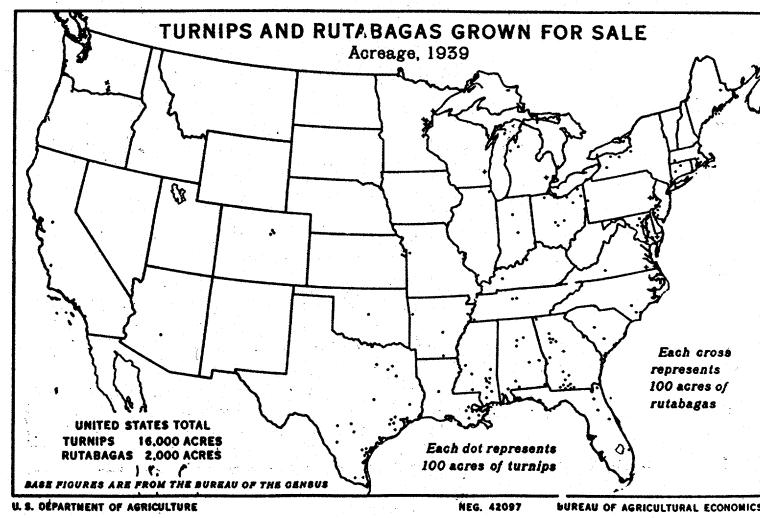


Fig.8

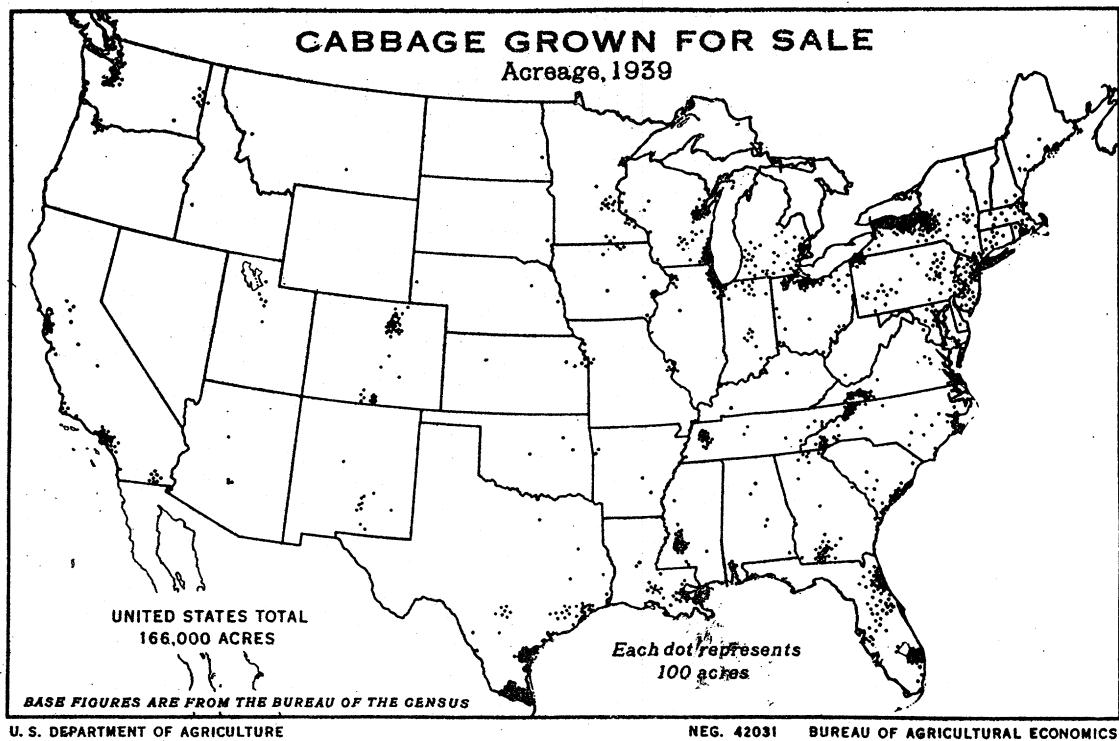


Fig.9

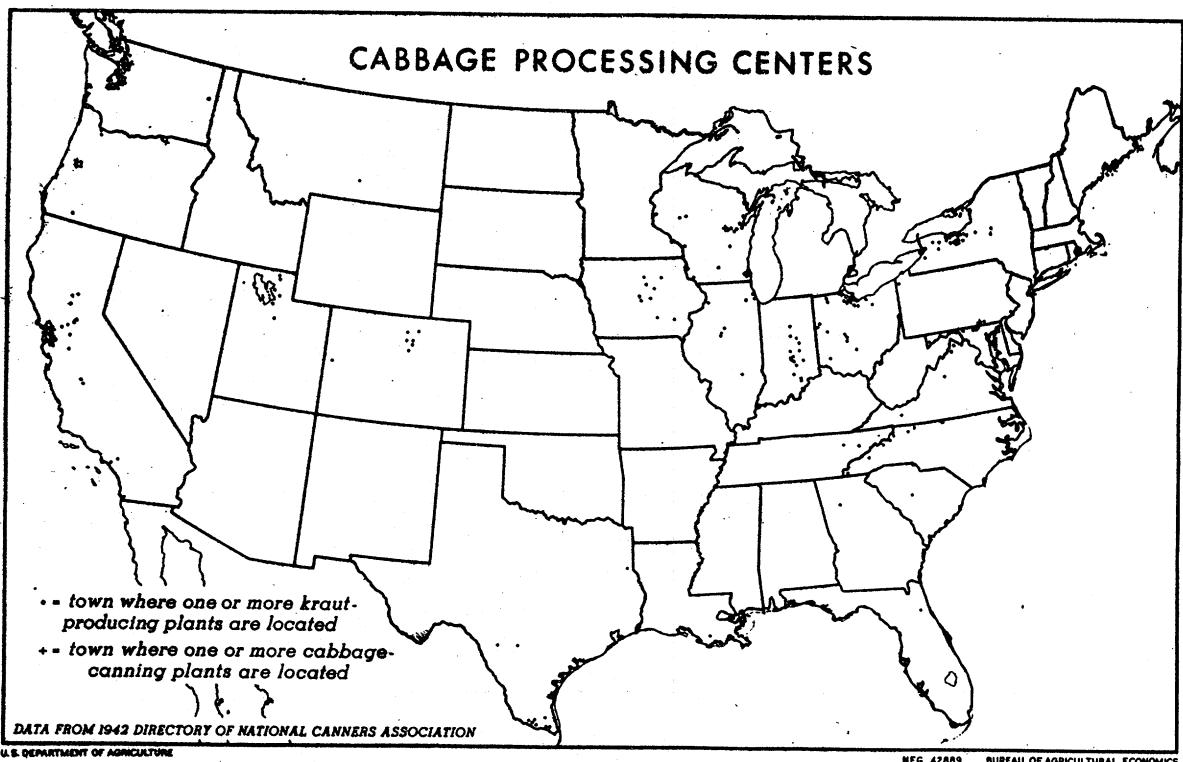


Fig.10

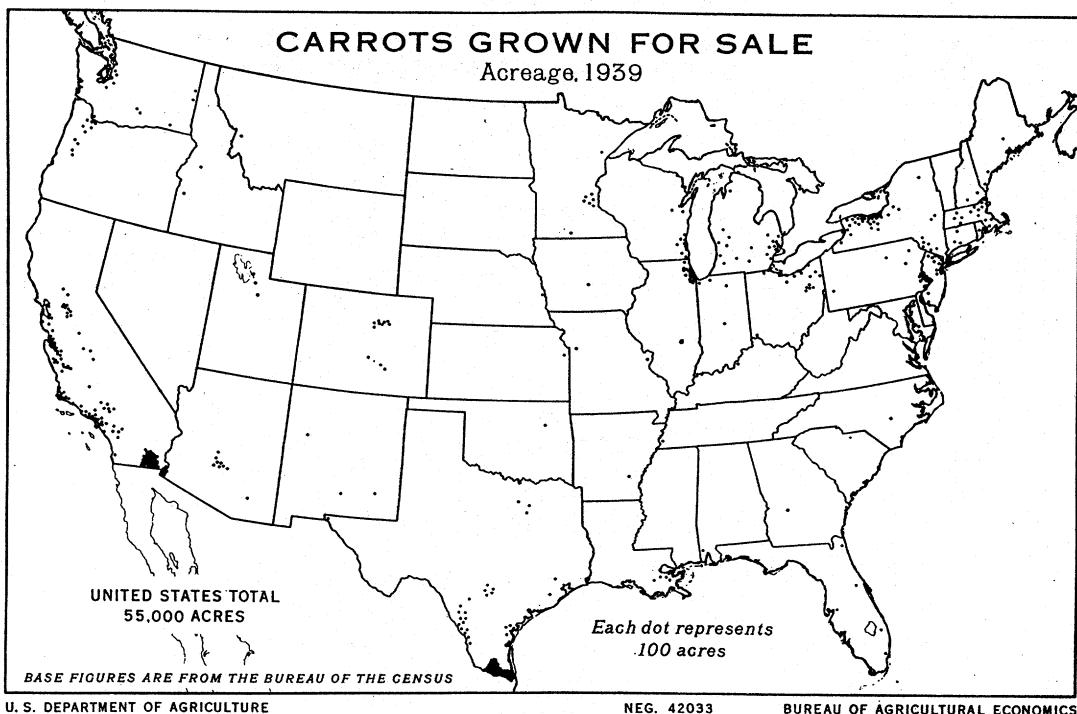


Fig. 11

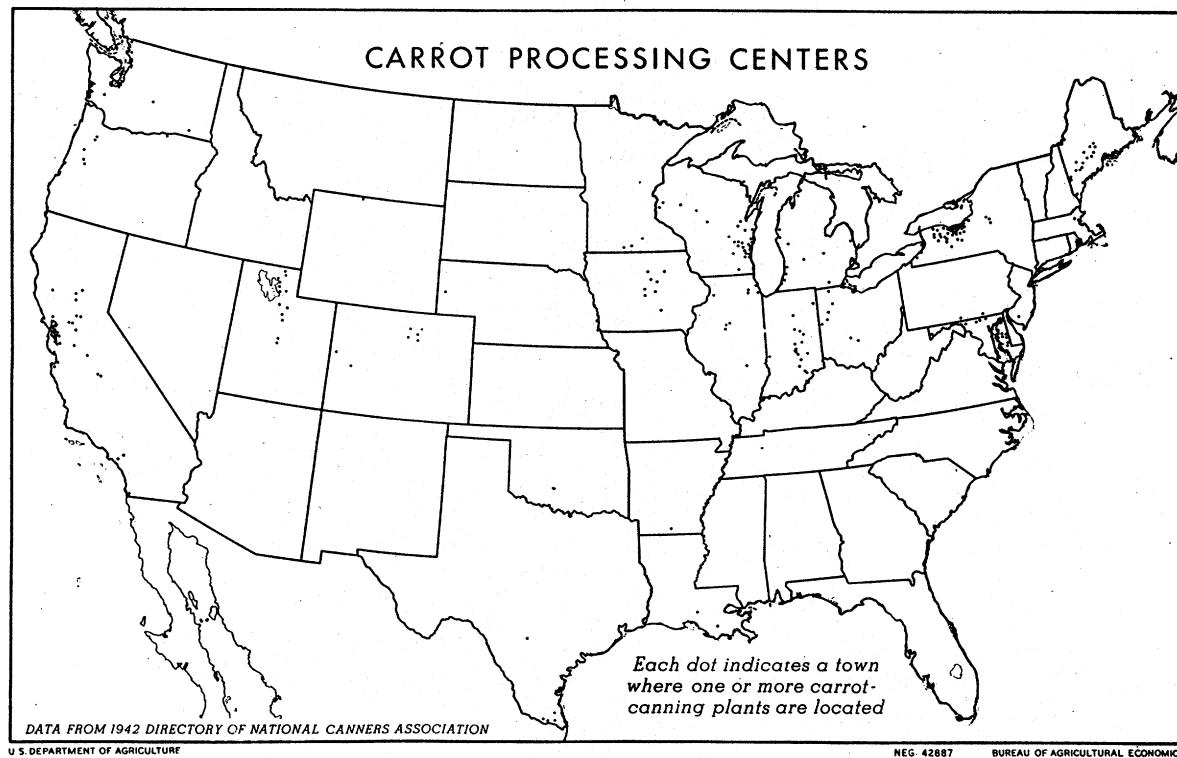


Fig. 12

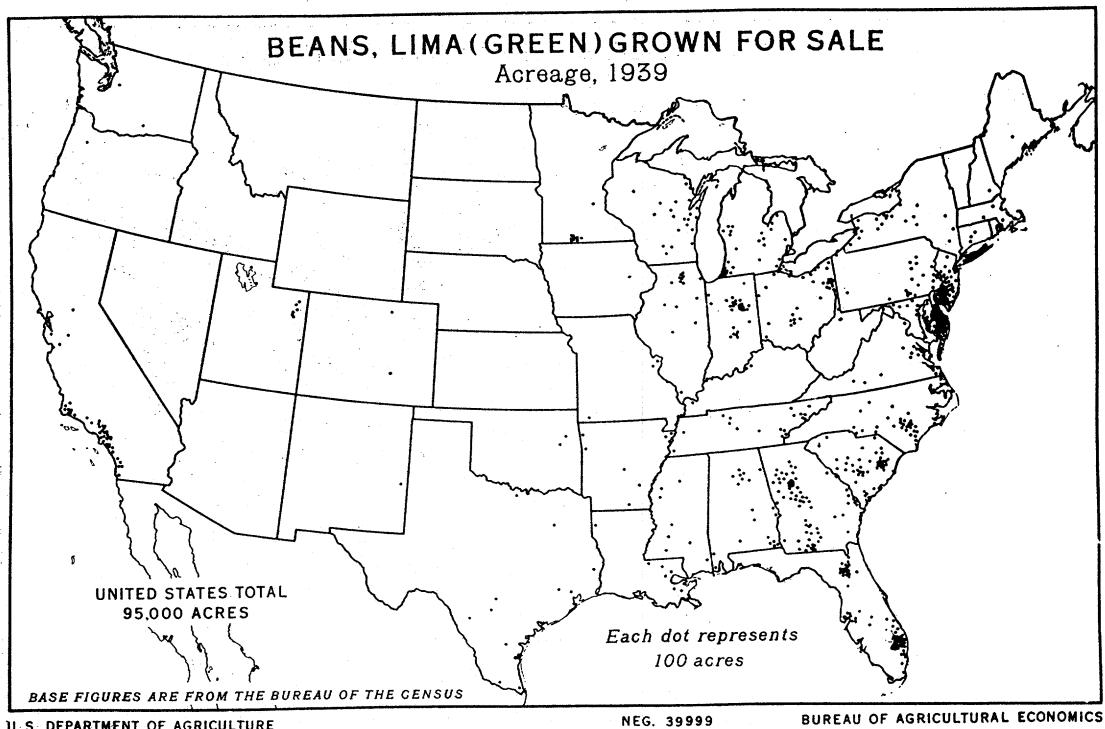


Fig.13

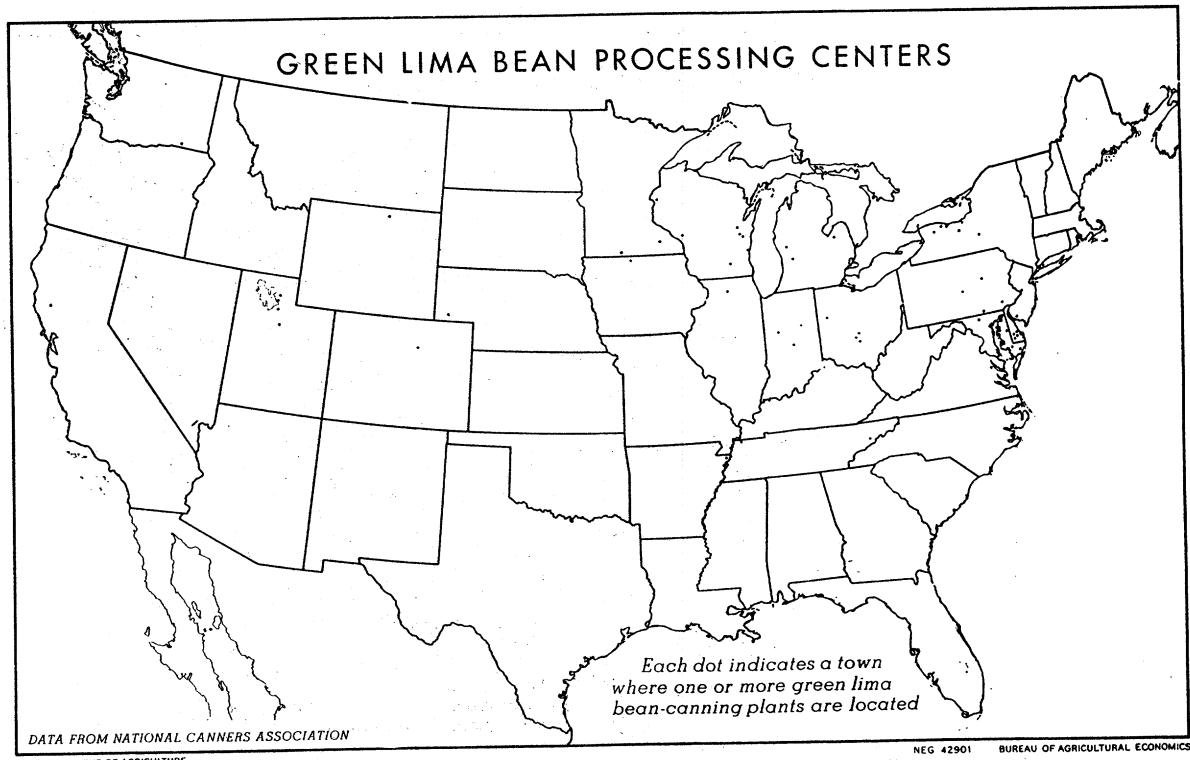


Fig.14

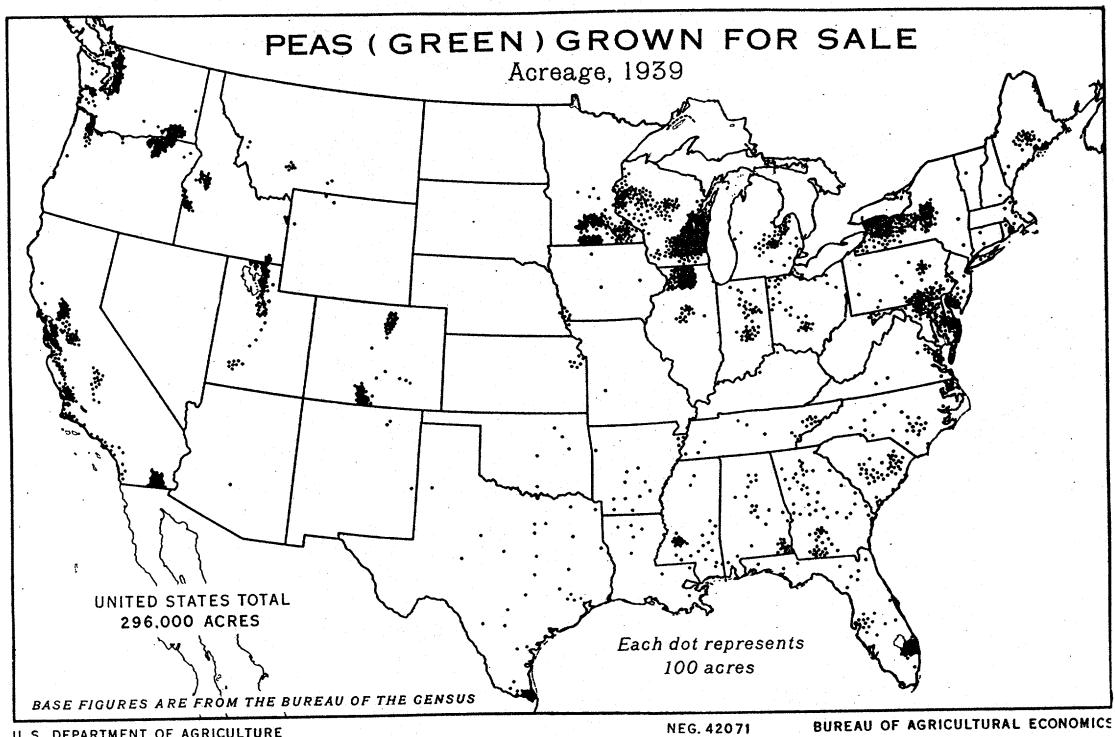


Fig.15

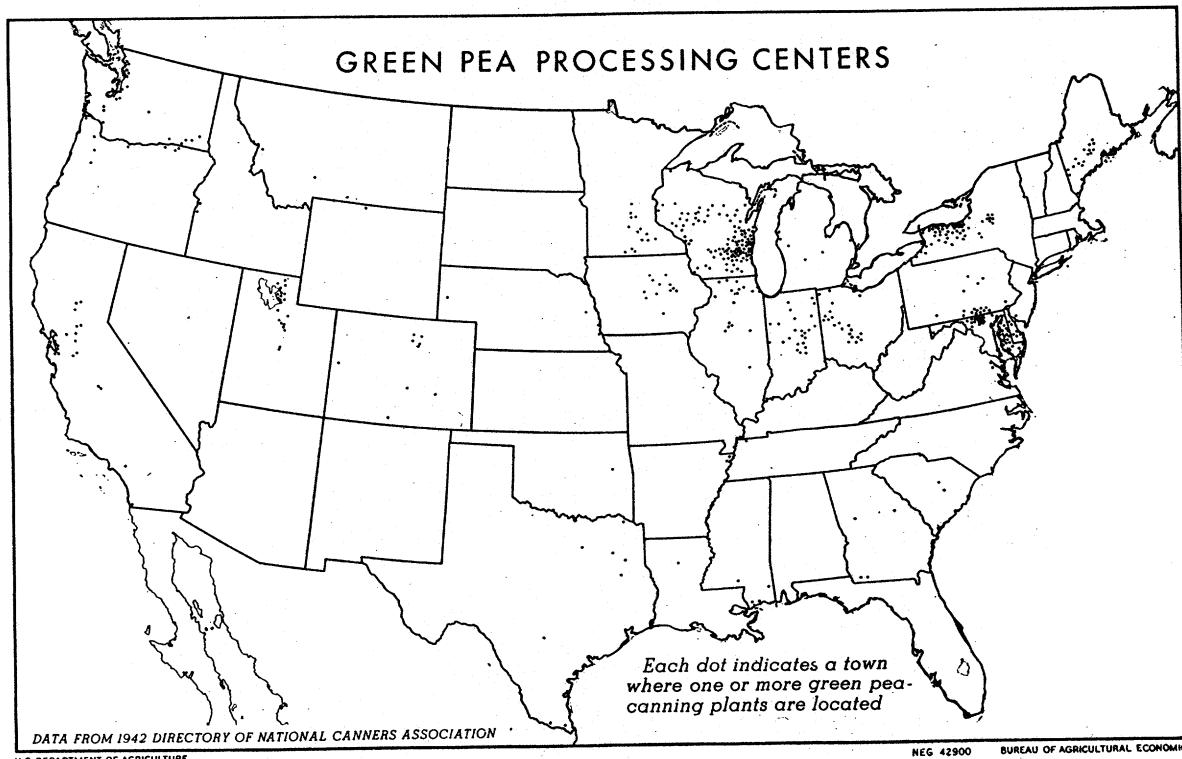


Fig.16



Fig. 17

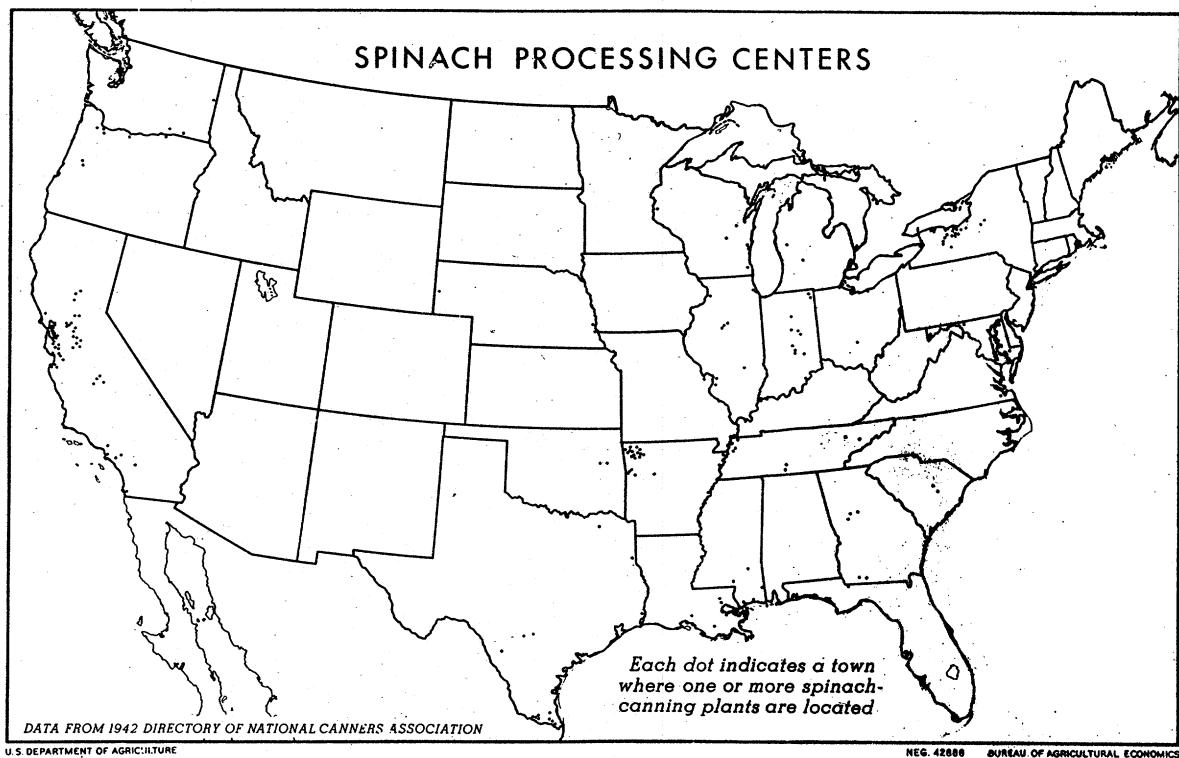


Fig. 18

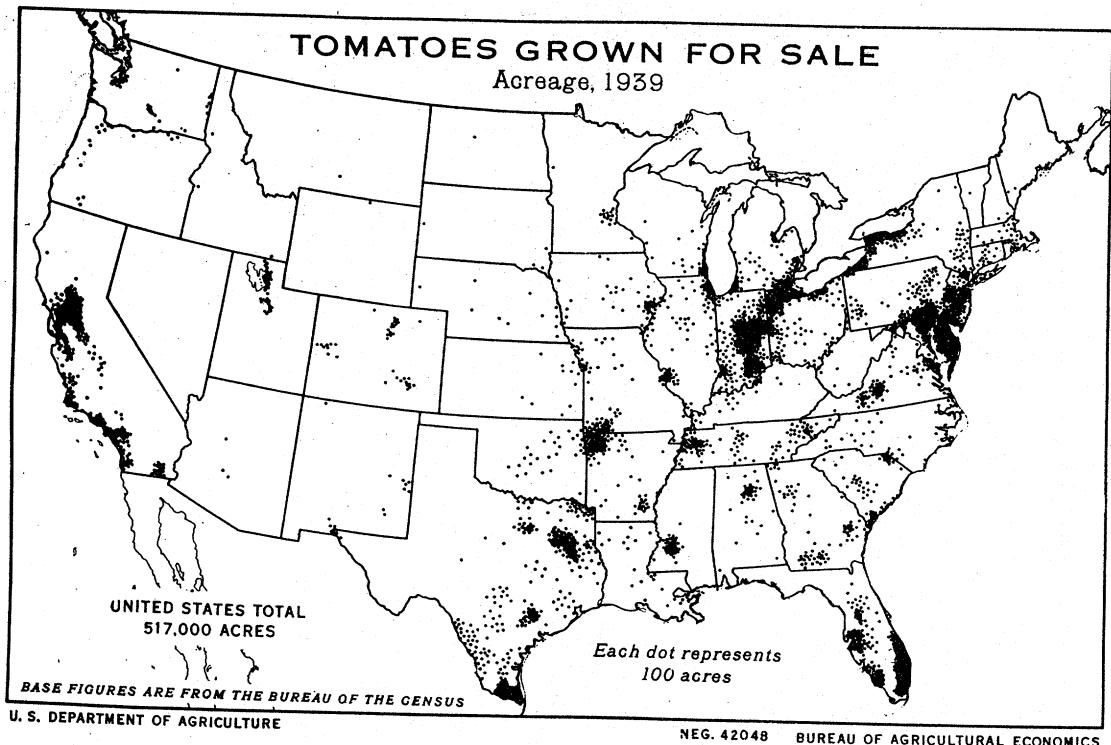


Fig.19

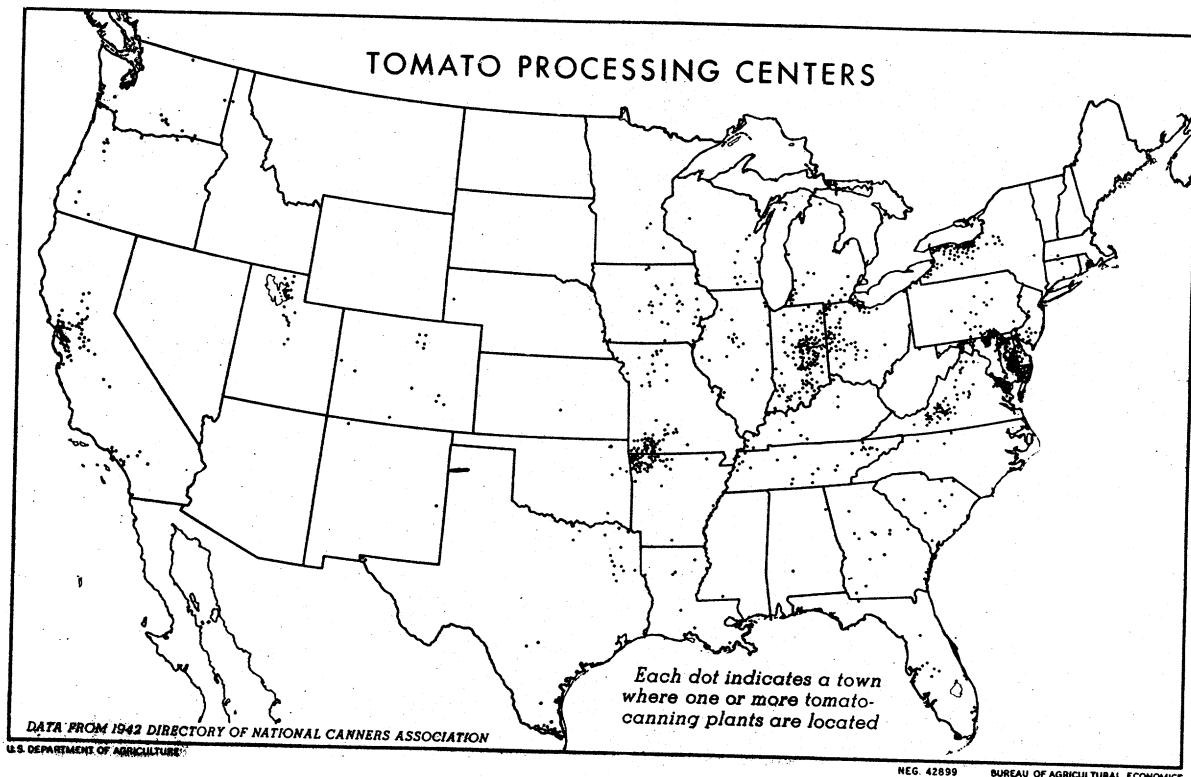


Fig.20

METHODS OF PROCESSING

	Fresh Packed	Canned	Dehydrated	Frozen
Beets				
Broccoli				
Cabbage				
Carrots				
Cauliflower				
Kale				
Lima Beans				
Peas				
Rutabagas & Turnips				
Spinach				
Tomatoes				

Fig. 21

SEASONAL AVAILABILITY OF CROPS

NORTHEAST

	Maine New Hampshire Vermont	Connecticut Massachusetts Rhode Island	New York Pennsylvania New Jersey	West Virginia Delaware Maryland	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets																
Broccoli																
Cabbage																
Carrots																
Cauliflower																
Kale																
Lima Beans																
Peas																
Rutabagas & Turnips																
Spinach																
Tomatoes																

Fig-22

GREAT LAKES

	Ohio	Wisconsin	Illinois	Indiana	Michigan	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets																	
Broccoli																	
Cabbage																	
Carrots																	
Cauliflower																	
Lima Beans																	
Peas																	
Rutabagas & Turnips																	
Spinach																	
Tomatoes																	

Fig-23

MIDWEST

	Missouri Kansas	Iowa Nebraska	North Dakota South Dakota	Minnesota	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets																
Cabbage																
Carrots																
Lima Beans																
Spinach																
Tomatoes																

Fig-24

SOUTHWEST

	Louisiana	Texas	Oklahoma	Arkansas	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets																
Broccoli																
Cabbage																
Carrots																
Cauliflower																
Lima Beans																
Peas																
Rutabagas & Turnips																
Spinach																
Tomatoes																

Fig-26

ROCKY MOUNTAINS

	New Mexico	Colorado	Utah	Idaho	Wyoming	Montana	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets																		
Broccoli																		
Cabbage																		
Carrots																		
Cauliflower																		
Lima Beans																		
Peas																		
Rutabagas & Turnips																		
Spinach																		
Tomatoes																		

Fig-27

PACIFIC

	California	Oregon	Washington	Nevada	Arizona	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets																	
Broccoli																	
Cabbage																	
Carrots																	
Cauliflower																	
Lima Beans																	
Peas																	
Rutabagas & Turnips																	
Spinach																	
Tomatoes																	

Fig-28

OPENING AND CLOSING DATES OF PACKING SEASON

NEW YORK

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets												
Cabbage												
Carrots												
Peas												
Spinach												
Tomatoes												

Fig-29

MARYLAND

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets												
Cabbage												
Lima Beans												
Peas												
Spinach												
Tomatoes												

Fig-30

PENNSYLVANIA

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Lima Beans												
Peas												
Tomatoes												

Fig-31

OHIO

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets												
Cabbage												
Peas												
Tomatoes												

Fig-32

NEW JERSEY

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets												
Lima Beans												
Peas												
Spinach												
Tomatoes												

Fig-33

WISCONSIN

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets												
Cabbage												
Carrots												
Peas												
Spinach												
Tomatoes												

Fig-34

DELAWARE

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Lima Beans												
Peas												
Tomatoes												

Fig-35

ILLINOIS

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Lima Beans												
Peas												
Tomatoes												

Fig-36

INDIANA

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Beets												
Cabbage												
Lima Beans												
Peas												
Spinach												
Tomatoes												

Fig-37

VIRGINIA

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Lima Beans												
Peas												
Spinach												
Tomatoes												

Fig-38

OPENING AND CLOSING DATES OF PACKING SEASON

MISSOURI

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Peas												
Spinach												
Tomatoes												

Fig. 39

TENNESSEE AND KENTUCKY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beets												
Cabbage												
Lima Beans												
Peas												
Spinach												
Tomatoes												

Fig. 40

MICHIGAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beets												
Cabbage												
Carrots												
Lima Beans												
Peas												
Spinach												
Tomatoes												

Fig. 41

KANSAS

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Peas												
Spinach												
Tomatoes												

Fig. 43

UTAH

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beets												
Cabbage												
Carrots												
Lima Beans												
Peas												
Tomatoes												

Fig. 45

WYOMING

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beets												
Carrots												
Lima Beans												
Peas												
Tomatoes												

Fig. 47

CALIFORNIA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beets												
Lima Beans												
Peas												
Spinach												
Tomatoes												

Fig. 46

OREGON AND WASHINGTON

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beets												
Cabbage												
Carrots												
Peas												
Spinach												
Tomatoes												

Fig. 48

FORAGE DRIER DISTRIBUTION

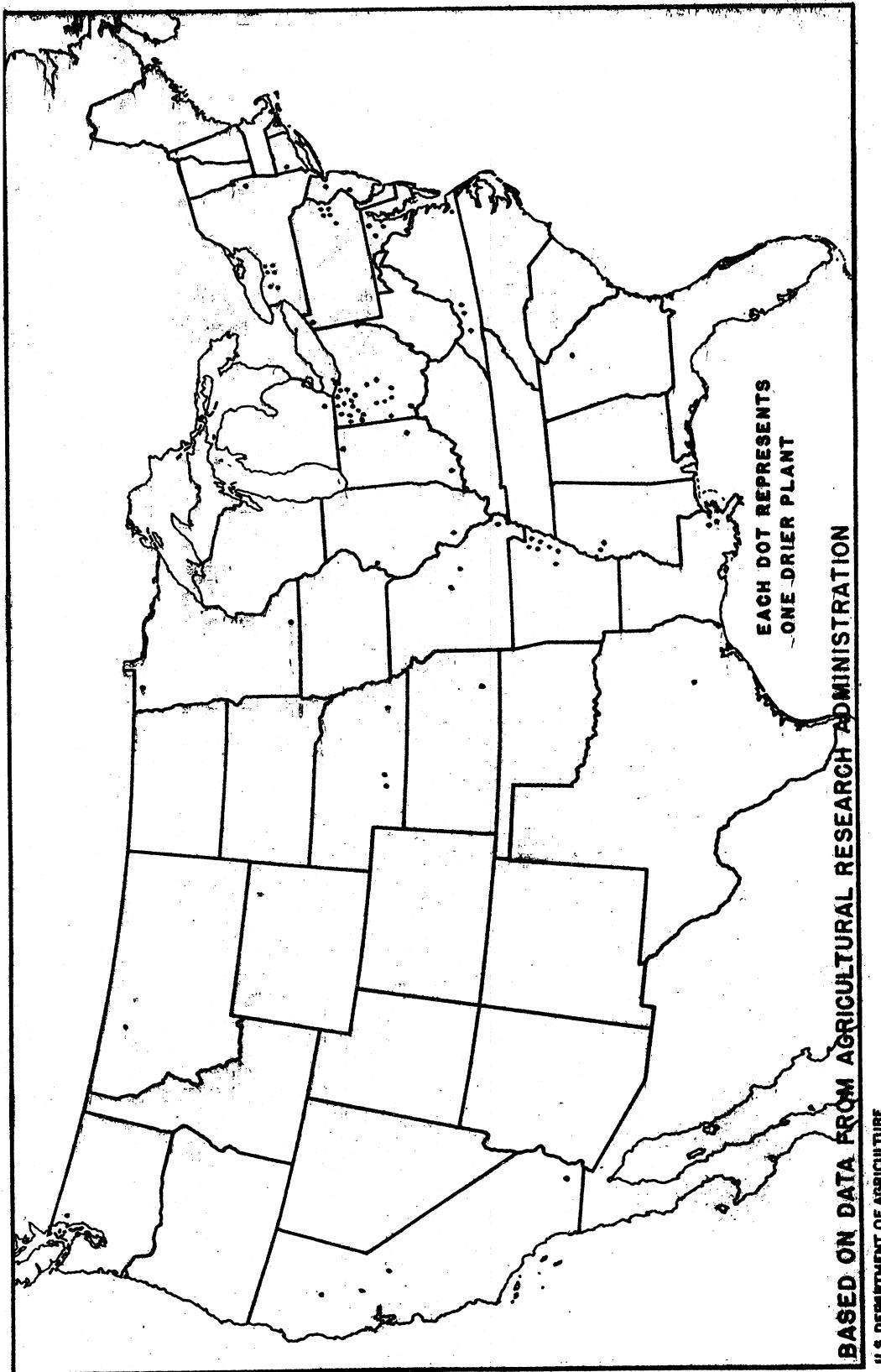


Fig. 49

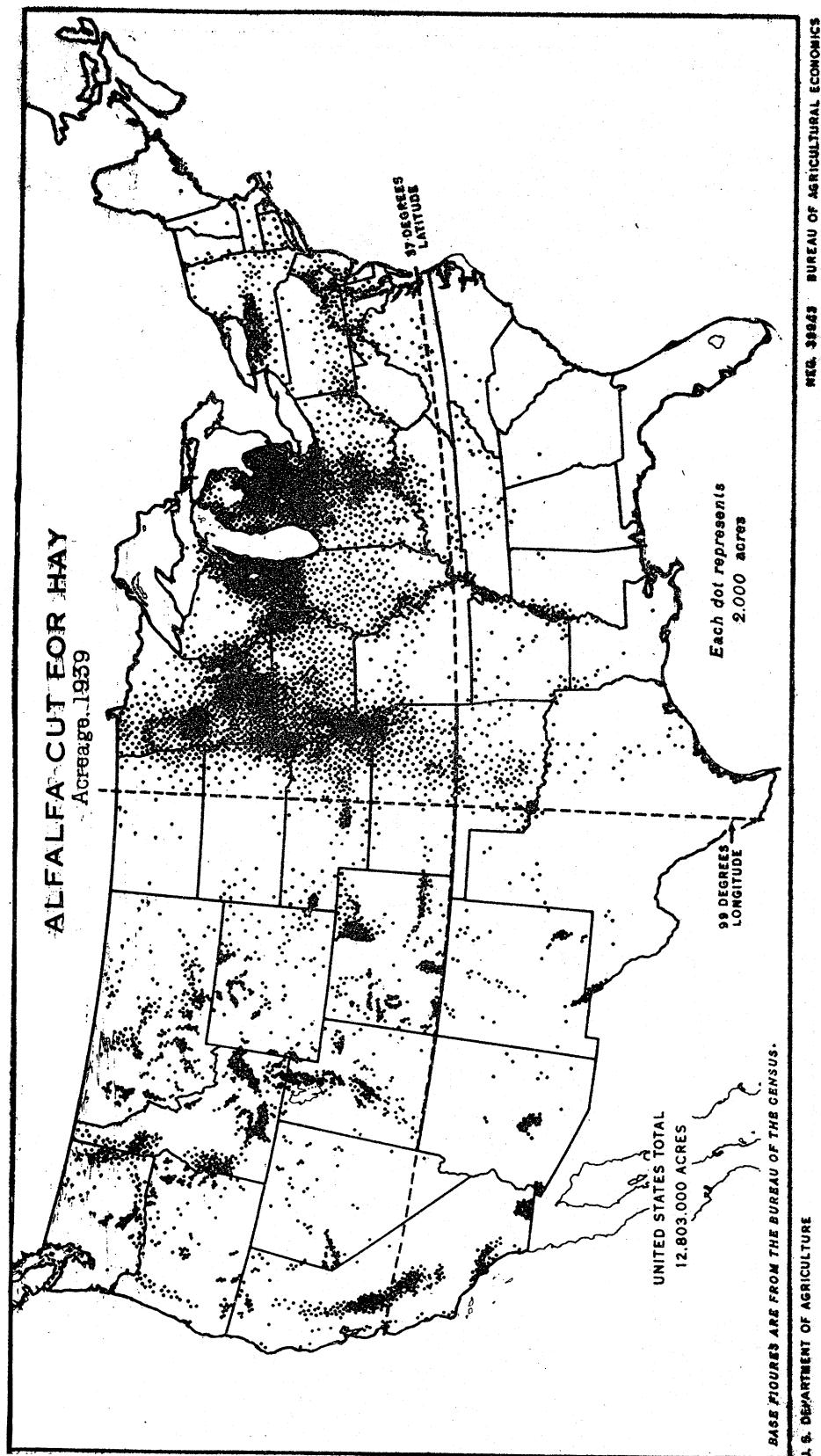


Fig. 50

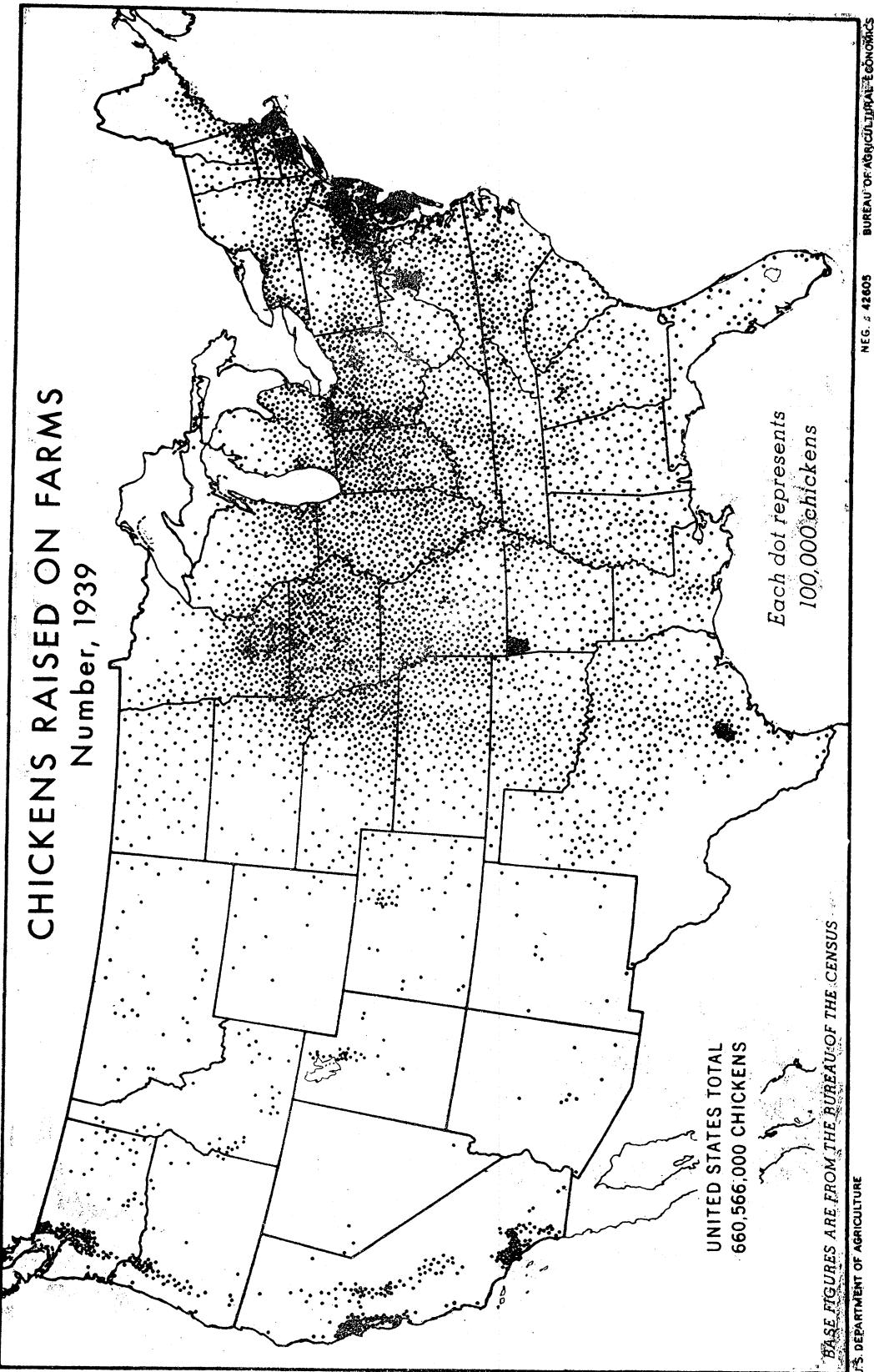


Fig. 51